Ex. 1 In the following alphabet series, which letter is eighth to the left of sixteenth letter from the right end ?

A B C D E F G H I J K L M
N O P Q R S T U V W X Y Z

(*a*) B (*b*) S (*c*) C (*d*) H (*e*) X

Sol. Counting from the right end of the given alphabet series *i.e.*, from Z, the sixteenth letter is K. Counting from K towards the left, the eighth letter is C. Hence, the answer is (*c*).

Ex. 2 If the following alphabet series is written in the reverse order, which letter will be fifth to the left of the fourteenth letter from the left ?

A B C D E F G H I J K L M
N O P Q R S T U V W X Y Z

(*a*) R (*b*) I (*c*) S (*d*) H (*e*) V

Sol. The new alphabet series obtained after reversing the order of alphabets is :

Z Y X W V U T S R Q P O N
M L K J I H G F E D C B A

Counting from the left end in the above series i.e., from Z, the fourteenth letter is M.

Counting from M towards the left, the fifth letter is R.

Hence, the answer is (*a*).

Ex. 3 How many D's are there in the following series which are immediately followed by W but not immediately preceded by K ?

K D C W K D W N K G D W W D H K V D W Z D W

(*a*) One (*b*) Two (*c*) Three (*d*) Four (*e*) Nil

Sol. Clearly, D's satisfying the given conditions can be marked as under :

K D C W K D W N K G [D] W W D H K V [D] W Z [D] W

Hence, the answer is (*c*).

EXERCISE 10G

Directions : ***Each of the following questions is based on the following alphabet series.***

A B C D E F G H I J K L M
N O P Q R S T U V W X Y Z

1. Which letter is exactly midway between H and S in the given alphabet ?

(*a*) L (*b*) M (*c*) N (*d*) O (*e*) No such letter

(S.B.I.P.O. 1994)

2. In the English alphabet, which letter will be to the immediate left of M ?

(*a*) N (*b*) L (*c*) O (*d*) K (*e*) None of these

3. Which letter is sixteenth to the right of the letter which is fourth to the left of I ?

(*a*) S (*b*) T (*c*) U (*d*) V (*e*) Y

4. Which alphabet comes immediately before the sixth alphabet from the left extreme of the given alphabets ?

(L.I.C. 1994)

(*a*) E (*b*) F (*c*) G (*d*) U (*e*) V

5. Which letter is the seventh to the right of the thirteenth letter from your left ?
(*a*) S (*b*) T (*c*) U (*d*) V (*e*) None of these
(Bank P.O. 1993)

6. Which letter will be the sixth to the right of the eleventh letter from the right end of the alphabet ?
(*a*) K (*b*) V (*c*) J (*d*) U (*e*) None of these

7. Which letter is seventh to the right of the eighteenth letter from the right end of the alphabet ? **(B.S.R.B. 1995)**
(*a*) K (*b*) O (*c*) P (*d*) R (*e*) None of these

8. If the above alphabet are divided in two equal halves — from A to M and N to Z, which letter in the later half would be corresponding to the letter J ?
(*a*) Q (*b*) V (*c*) X (*d*) W (*e*) None of these
(Bank P.O. 1993)

9. Which letter is midway between 22nd letter from the left and 21st letter from the right ? **(Bank P.O. 1995)**
(*a*) L (*b*) M (*c*) O (*d*) P (*e*) None of these

10. If the above alphabet is written in the reverse order, which will be the eighth letter to the right of O ?
(*a*) F (*b*) G (*c*) V (*d*) W (*e*) None of these

11. If the above alphabets were written in the reverse order, which will be the fifth letter to the left of the ninth letter from the right ?
(*a*) P (*b*) N (*c*) D (*d*) W (*e*) M

12. If the given alphabet is arranged in reverse order, which letter will be the eighth letter to the left of the seventh letter counting from the right end ?
(*a*) N (*b*) O (*c*) P (*d*) Q (*e*) None of these
(Bank P.O. 1992)

13. If the above alphabet are written in the reverse order, which letter will be twelfth to the left of the sixteenth letter from your left ?
(*a*) D (*b*) V (*c*) W (*d*) X (*e*) None of these

14. If the given sequence of letters is written in a reverse order, which of the following will be the seventh letter to the left of eighth letter from your right ?
(*a*) L (*b*) M (*c*) O (*d*) P (*e*) None of these
(Bank P.O. 1995)

15. Which letter should be ninth letter to the left of ninth letter from the right, if the first half of the given alphabet is reversed ? **(U.T.I. 1993)**
(*a*) D (*b*) E (*c*) F (*d*) I (*e*) None of these

16. If every alternate letter starting from B is deleted from the given alphabet, which of the following will be the tenth letter from the right end ?
(*a*) G (*b*) D (*c*) Q (*d*) H (*e*) None of these
(Bank P.O. 1995)

17. Write the above English alphabet in reverse order. First cancel every second letter and then select that letter which divides the remaining letters of the alphabet in two equal parts. This letter is :
(*a*) L (*b*) M (*c*) N (*d*) P (*e*) None of these

18. If the letters of the given alphabet interchange positions, so that A takes the place of Z and Z takes the place of A; B takes the place of Y and Y takes the place of B and so on, what will be the thirteenth letter from the right ?
(*a*) M (*b*) N (*c*) O (*d*) L (*e*) None of these

19. If the alphabet is written in the reverse order and every alternate letter starting with Y is dropped, which letter will be exactly in the middle of the remaining letters of the alphabet ? **(Bank P.O. 1996)**

(*a*) M (*b*) N (*c*) O (*d*) M or O (*e*) None of these

20. In the given alphabet, starting from the fifth letter from the left, if twelve letters are written in reverse order, then which letter will be the seventh to the left of the fourteenth letter from the right ? **(Bank P.O. 1994)**

(*a*) H (*b*) L (*c*) M (*d*) N (*e*) None of these

21. If the second half of the given alphabet is written in reverse order, which letter will be seventh to the right of the twelfth letter from the left end ?

(*a*) R (*b*) S (*c*) U (*d*) V (*e*) None of these

22. Which letter should be fourth to the left of twelfth letter from the right if the second half of the given alphabet is reversed ? **(Bank P.O. 1993)**

(*a*) J (*b*) K (*c*) L (*d*) M (*e*) None of these

23. If the first and the second letters interchange their positions and similarly the third and the fourth letters, the fifth and the sixth letters and so on, which letter will be the seventeenth from your right ?

(*a*) F (*b*) H (*c*) I (*d*) J (*e*) None of these

24. If the first ten letters of the given alphabet are written in the reverse order, which of the following letters will be the seventh to the left of the twelfth letter from the right end ? **(Bank P.O. 1994)**

(*a*) B (*b*) C (*c*) H (*d*) I (*e*) None of these

25. If every alternate letter starting from B of the given alphabet is written in small letters, rest all are written in capital letters, how will the month of 'September' be written ? **(Bank P.O. 1995)**

(*a*) SEpteMbeR (*b*) SEptembER (*c*) sePTemBeR

(*d*) SEptEMbEr (*e*) None of these

26. If the alternate letters in the given alphabet starting from A are written in small and rest all in capital letters, which of the following will represent the third month after July ? **(Bank P.O. 1995)**

(*a*) OCTOBER (*b*) OCtObEr (*c*) oCtObEr

(*d*) ocToBeR (*e*) None of these

27. If every even letter beginning from B is replaced by odd number beginning with 3, which letter/number will be the third to the right of the tenth number/letter counting from your right ? **(Bank P.O. 1996)**

(*a*) M (*b*) S (*c*) 11 (*d*) 23 (*e*) None of these

28. Which letter will be sixth to the right of the third letter from left of the letter which is exactly in the middle of the letters in the series given below ?

A B C D E Z Y X W V Q R S T

U F G H I J K L M N O P A **(Bank P.O. 1996)**

(*a*) F (*b*) G (*c*) Q (*d*) R (*e*) None of these

29. Which is the letter as far from the first letter of the alphabet given below as the letter C is from the letter midway between K and R in 'QUICKSILVER' ?

(*a*) C (*b*) D (*c*) F (*d*) J (*e*) V

30. How many A's are there in the following series which are immediately followed by B as well as immediately preceded by Z ? **(Bank P.O. 1993)**

A M B Z A N A A B Z A B A Z B A P Z A B A Z A B

(*a*) Nil (*b*) One (*c*) Two (*d*) Three (*e*) More than three

31. In the following list of letters, how many O's are followed by Q's but not preceded by D's ? **(C.B.I. 1993)**

D O Q O D Q O D O D Q D O Q D S D Q P
O Q D S S S D O Q O Q D O Q D D D O Q

(*a*) 0 (*b*) 1 (*c*) 2 (*d*) 3

32. How many T's are there in the following sequence which are immediately preceded by P but not immediately followed by S ? **(Bank P.O. 1995)**

S T P Q T S P T R P T S R P S T Q P T R P T M P T S

(*a*) None (*b*) One (*c*) Two (*d*) Three (*e*) None of these

33. In the following series, count each N which is immediately followed by X but X is not immediately followed by T. How many such N's are there ? **(R.B.I. 1990)**

N X N T Q M N X T M X N X C N Q M N N X Q N X T X N A M X N X M

(*a*) 2 (*b*) 4 (*c*) 5 (*d*) 7 (*e*) 9

34. In the following letter sequence, how many n's are followed by m but not preceded by h ? **(S.S.C. 1996)**

a g r h t n m b c n m l b u v n m h e r h
n m g f e h n m e c n m w q a n m h l b

(*a*) 4 (*b*) 5 (*c*) 6 (*d*) 7

Directions (*Questions 35 to 38*) : *Study the letter series given below and answer the questions that follow :* **(Hotel Management, 1992)**

H D Y S M W N B Q P O C R T B L Z V E G U F

35. Which is the only letter that occurs twice ?

(*a*) B (*b*) E (*c*) M (*d*) S

36. Which two neighbours in the given arrangement are farthest in the alphabetical order ?

(*a*) B and Q (*b*) D and Y (*c*) U and F (*d*) V and E

37. Which letter has the same neighbours as in the alphabetical order although they have changed places ?

(*a*) M (*b*) N (*c*) O (*d*) P

38. Which three letters have the same distance as they have in the alphabetical order although they have changed places ?

(*a*) HMP (*b*) NQZ (*c*) QOE (*d*) YLF

ANSWERS

1. (*e*) : There are ten letters between H and S and as such, there is no letter which lies exactly in the middle.

2. (*b*) : Clearly, L is the letter to the immediate left of M.

3. (*c*) : Clearly, the fourth letter to the left of I is E. The sixteenth letter to the right of E is U.

4. (*a*) : The sixth letter from the left is F. E comes immediately before F.

5. (*b*) : Counting from the left *i.e.*, A in the given alphabet, the thirteenth letter is M. Counting from M towards the right, the seventh letter is T.

6. (*b*) : Counting from the right in the given alphabet series *i.e.*, Z, the eleventh letter is P. The sixth letter to the right of P is V.

7. (*c*) : Counting from the right in the given alphabet series *i.e.*, from Z, the eighteenth letter is I.
The seventh letter to the right of I is P.

8. (*d*) : J is the tenth letter in the first half.
The tenth letter in the later half is W.

9. (*e*) : 22nd letter from the left is V. 21st letter from the right is F.
The letter midway between F and V is N.

10. (*b*) : The new alphabet series is :

Z Y X W V U T S R Q P O N
M L K J I H G F E D C B A

Clearly, the eighth letter to the right of O is G.

11. (*b*) : The new alphabet series is :

Z Y X W V U T S R Q P O N
M L K J I H G F E D C B A

The ninth letter from the right is I.
The fifth letter to the left of I is N.

12. (*b*) : The new alphabet series is as shown in Solution 11.
Counting from the right, the seventh letter is G.
The eighth letter to the left of G is O.

13. (*c*) : The new alphabet series is as shown in Solution 11.
The sixteenth letter from the left is K.
Counting from K towards the left, the twelfth letter is W.

14. (*c*) : The new alphabet series is as shown in Solution 11.
The eighth letter from the right is H.
The seventh letter to the left of H is O.

15. (*b*) : The new alphabet series is :

M L K J I H G F E D C B A
N O P Q R S T U V W X Y Z

The ninth letter from the right is R.
The ninth letter to the left of R is E.

16. (*a*) : The new alphabet series is :

A C E G I K M O Q S U W Y

The tenth letter from the right is G.

17. (*c*) : The new alphabet series is :

Z Y X W V U T S R Q P O N
M L K J I H G F E D C B A

Cancelling every second letter, the above series becomes

Z X V T R P N L J H F D B

The middle letter is N.

18. (*a*) : The new alphabet series is :

Z Y X W V U T S R Q P O N
M L K J I H G F E D C B A

Counting from the right in the above series *i.e.*, A, the thirteenth letter is M.

19. (*b*) : Same as Solution 17.

20. (*e*) : The new alphabet series is :

A B C D P O N M L K J I H
G F E Q R S T U V W X Y Z

The fourteenth letter from the right is H.

The seventh letter to the left of H is O.

21. (*c*) : The new alphabet series is :

A B C D E F G H I J K L M
Z Y X W V U T S R Q P O N

The twelfth letter from the left is L.

The seventh letter to the right of L is U.

22. (*b*) : The new alphabet series is as shown in Solution 21.

The twelfth letter from the right is Y.

The fourth letter to the left of Y is K.

23. (*c*) : The new alphabet series is :

B A D C F E H G J I L K N
M P O R Q T S V U X W Z Y

The seventeenth letter from the right is I.

24. (*b*) : The new alphabet series is :

J I H G F E D C B A K L M
N O P Q R S T U V W X Y Z

The twelfth letter from the right is O.

The seventh letter to the left of O is C.

25. (*d*) : The new alphabet series is :

A b C d E f G h I j K l M
n O p Q r S t U v W x Y z

Clearly 'SEPTEMBER' will be written as 'SEptEMbEr'.

26. (*d*) : The new alphabet series is :

a B c D e F g H i J k L m
N o P q R s T u V w X y Z

The third month after July is October.

Clearly, 'OCTOBER' will be written as 'ocToBeR'.

27. (*e*) : The new series is :

A 3 C 5 E 7 G 9 I 11 K 13 M
15 O 17 Q 19 S 21 U 23 W 25 Y 27

Counting from the right, the tenth character is Q.

The third character to the right of Q is 21.

28. (*b*) : The letter in the middle of the given series is T. The third letter to the left of T is Q.

The sixth letter to the right of Q is G.

29. (*d*) : The letter midway between K and R in 'QUICKSILVER' is L. In the alphabet, L is the ninth letter after C. Similarly, J is the ninth letter from the first letter of the alphabet, which is A.

30. (*d*) : A M B Z A N A A B Z [A] B A Z B A P Z [A] B A Z [A] B

31. (*c*) : D O Q O D Q O D O D Q D O Q D S D Q P [O]

Q D S S S D O Q [O] Q D O Q D D D O Q

32. (*d*) : S T P Q T S P [T] R P T S R P S T Q P [T] R P [T] M P T S

33. (*b*) : N [X] N T Q M N X T M X [N] X C N Q M
N [N] X Q N X T X N A M X [N] X M

34. (*b*) : a g r h t [n] m b c [n] m l b u v [n] m h e r
h n m g f e h n m e c [n] m w q a [n] m h l b

35. (*a*) : Clearly, B occurs twice.

36. (*b*) : Clearly, D and Y are neighbours in the given series and are separated by the maximum number of letters *i.e.*, 20 in the English alphabet.

37. (*d*) : P has O and Q as its neighbours in the given series as well as in the English alphabet.

38. (*d*) : There are 12 letters between L and Y and 5 letters between F and L in the given series as well as in the English alphabet.

TYPE 5 : WORD FORMATION

Ex. 1. Select the combination of numbers so that letters arranged accordingly will form a meaningful word.

V	A	R	S	T	E
1	2	3	4	5	6

(*a*) 2, 3, 1, 6, 4, 5 (*b*) 4, 5, 2, 3, 1, 6 (*c*) 6, 3, 4, 5, 2, 1 (*d*) 3, 2, 4, 5, 6, 1

Sol. Clearly, the given letters, when arranged in the order 4, 5, 2, 3, 1, 6 form the word 'STARVE'. Hence, the answer is (*b*).

Ex. 2. If it is possible to make a meaningful word with the second, the sixth, the ninth and the twelfth letters of the word 'CONTRIBUTION', which of the following will be the last letter of that word ? If more than one such words can be made, give M as the answer and if no such word is there, give X as the answer.

(*a*) N (*b*) O (*c*) T (*d*) M (*e*) X

Sol. The second, sixth, ninth and twelfth letters of the word 'CONTRIBUTION' are O, I, T and N. Clearly, only one word can be formed using these letters, which is INTO.
The last letter in INTO is O.
Hence, the answer is (*b*).

Ex. 3. Choose one word out of the given alternatives, which cannot be formed from the letters of the word CONSULTATION.

(*a*) CONSTANT (*b*) NATION (*c*) SALUTE (*d*) STATION

Sol. Carefully looking at the words, we find that the word 'CONSULTATION' does not contain the letter E. So, the word 'SALUTE' cannot be formed.
Hence, the answer is (*c*).

Note : In such type of questions, remember that each letter in the given word is to be used only once.

EXERCISE 10H

Directions (*Questions 1 to 40*) : *In each of the following questions, a group of letters is given which are numbered 1, 2, 3, 4, 5 and 6. Below are given four alternatives containing combinations of these numbers. Select that combination of numbers so that letters arranged accordingly, form a meaningful word.*

1. T R I F U
1 2 3 4 5 **(Railways, 1995)**
(*a*) 3, 1, 2, 4, 5 (*b*) 4, 2, 5, 3, 1 (*c*) 4, 3, 2, 1, 5 (*d*) 5, 3, 2, 1, 4

2. A C E S T H
1 2 3 4 5 6
(*a*) 6, 1, 4, 5, 3, 2 (*b*) 2, 6, 1, 4, 5, 3 (*c*) 4, 3, 5, 6, 1, 2 (*d*) 6, 3, 2, 1, 4, 5

3. G T A E N M
1 2 3 4 5 6
(*a*) 1, 3, 2, 5, 4, 6 (*b*) 1, 3, 2, 6, 4, 5 (*c*) 6, 3, 5, 1, 4, 2 (*d*) 6, 3, 1, 5, 4 2

4. N R O C T A
1 2 3 4 5 6
(*a*) 1, 6, 2, 4, 3, 5 (*b*) 2, 3, 5, 4, 6, 1 (*c*) 4, 6, 2, 5, 3, 1 (*d*) 6, 5, 2, 3, 1, 4

5. G A N I M E
1 2 3 4 5 6
(*a*) 1, 2, 4, 3, 6, 5 (*b*) 6, 3, 4, 1, 5, 2 (*c*) 5, 2, 1, 4, 3, 6 (*d*) 2, 5, 1, 4, 3, 6

6. D I F E R N
1 2 3 4 5 6
(*a*) 1, 4, 3, 6, 2, 5 (*b*) 6, 4, 3, 5, 2, 1 (*c*) 3, 5, 2, 4, 6, 1 (*d*) 5, 4, 3, 2, 6, 1

7. K A T C E L
1 2 3 4 5 6
(*a*) 4, 2, 3, 1, 5, 6 (*b*) 1, 2, 4, 5, 6, 3 (*c*) 6, 5, 3, 2, 4, 1 (*d*) 3, 2, 4, 1, 6, 5

8. R U S G A
1 2 3 4 5
(*a*) 1, 5, 4, 2, 3 (*b*) 5, 3, 4, 1, 2 (*c*) 3, 2, 4, 5, 1 (*d*) 4, 5, 3, 2, 1

9. C E L S M U
1 2 3 4 5 6
(*a*) 4, 6, 3, 5, 2, 1 (*b*) 5, 6, 4, 1, 3, 2 (*c*) 4, 6, 5, 2, 3, 1 (*d*) 5, 2, 3, 1, 6, 4

10. H N R C A B
1 2 3 4 5 6
(*a*) 4, 1, 5, 6, 2, 3 (*b*) 6, 3, 5, 2, 4, 1 (*c*) 3, 5, 6, 4, 1, 2 (*d*) 2, 5, 3, 4, 1, 6

11. E L B M A G
1 2 3 4 5 6
(*a*) 6, 5, 4, 3, 2, 1 (*b*) 3, 1, 6, 4, 5, 2 (*c*) 4, 5, 6, 3, 1, 2 (*d*) 2, 1, 6, 3, 5, 4

12. R T A O U H
1 2 3 4 5 6
(*a*) 1, 3, 4, 5, 6, 2 (*b*) 2, 3, 6, 4, 5, 1 (*c*) 6, 3, 2, 4, 5, 1 (*d*) 3, 5, 2, 6, 4, 1

13. T L E M N A
1 2 3 4 5 6
(*a*) 2, 6, 4, 5, 3, 1 (*b*) 3, 2, 4, 6, 5, 1 (*c*) 4, 3, 5, 1, 6, 2 (*d*) 5, 3, 2, 4, 6, 1

14. A E H R K N
1 2 3 4 5 6
(*a*) 4, 1, 5, 3, 2, 6 (*b*) 6, 1, 5, 3, 4, 2 (*c*) 3, 1, 6, 5, 2, 4 (*d*) 5, 3, 1, 4, 2, 6

15. I N L A S G
1 2 3 4 5 6
(*a*) 6, 1, 3, 5, 4, 2 (*b*) 5, 1, 6, 2, 4, 3 (*c*) 3, 4, 6, 1, 2, 5 (*d*) 2, 4, 3, 6, 1, 5

16. T L P N A E
1 2 3 4 5 6
(*a*) 3, 2, 5, 4, 6, 1 (*b*) 3, 2, 5, 4, 1 6 (*c*) 4, 5, 3, 6, 2, 1 (*d*) 4, 6, 1, 3, 5, 2

17. R P E D I
1 2 3 4 5
(*a*) 1, 3, 2, 5, 4 (*b*) 2, 1, 5, 4, 3 (*c*) 3, 2, 1, 5, 4 (*d*) 4, 3, 2, 1, 5

18. I P E L O C
1 2 3 4 5 6 **(Railways, 1995)**
(*a*) 1, 4, 3, 5, 2, 6 (*b*) 2, 5, 4, 1, 6, 3 (*c*) 3, 4, 5, 1, 2, 6 (*d*) 4, 5, 1, 2, 3, 6

19. R M N B U E
1 2 3 4 5 6
(*a*) 2, 6, 3, 4, 1, 5 (*b*) 4, 6, 3, 2, 1, 5 (*c*) 3, 5, 2, 4, 6, 1 (*d*) 1, 5, 4, 2, 6, 3

20. T N D R A E
1 2 3 4 5 6
(*a*) 1, 6, 2, 3, 5, 4 (*b*) 3, 6, 2, 4, 5, 1 (*c*) 5, 4, 3, 6, 2, 1 (*d*) 4, 5, 3, 6, 2, 1

21. E H R A S P
1 2 3 4 5 6
(*a*) 5, 2, 4, 6, 1, 3 (*b*) 6, 2, 3, 4, 5, 1 (*c*) 2, 4, 6, 1, 3, 5 (*d*) 3, 4, 2, 1, 6, 5

22. T E L S C A
1 2 3 4 5 6
(*a*) 1, 2, 3, 4, 6, 5 (*b*) 4, 6, 5, 1, 2, 3 (*c*) 5, 6, 4, 1, 3, 2 (*d*) 6, 5, 3, 2, 4, 1

23. E O C D L I
1 2 3 4 5 6
(*a*) 3, 2, 5, 4, 6, 1 (*b*) 4, 2, 3, 5, 6, 1 (*c*) 3, 2, 4, 5, 6, 1 (*d*) 4, 2, 3, 6, 5, 1

24. A M D E N R
1 2 3 4 5 6
(*a*) 2, 1, 5, 3, 4, 6 (*b*) 6, 4, 2, 1, 5, 3 (*c*) 3, 4, 5, 2, 1, 6 (*d*) 1, 6, 2, 4, 5, 3

25. T I R B H G
1 2 3 4 5 6
(*a*) 1, 3, 2, 4, 6, 5 (*b*) 4, 3, 2, 6, 5, 1 (*c*) 4, 5, 2, 3, 6, 1 (*d*) 3, 2, 6, 5, 4, 1

26. R A C E T
1 2 3 4 5
(*a*) 1, 2, 3, 4, 5 (*b*) 3, 2, 1, 4, 5 (*c*) 5, 2, 3, 4, 1 (*d*) 5, 1, 2, 3, 4

27. L A E M V R
1 2 3 4 5 6
(*a*) 1, 2, 6, 4, 3, 5 (*b*) 4, 2, 6, 5, 3, 1 (*c*) 5, 3, 6, 4, 2, 1 (*d*) 6, 3, 1, 4, 2, 5

28. R T E O D P
1 2 3 4 5 6
(*a*) 1, 3, 5, 6, 4, 2 (*b*) 2, 3, 1, 6, 4, 5 (*c*) 5, 3, 6, 4, 1, 2 (*d*) 6, 3, 5, 1, 4, 2

29. E H N T O R
1 2 3 4 5 6
(*a*) 2, 5, 3, 4, 1, 6 (*b*) 4, 2, 6, 5, 3, 1 (*c*) 2, 5, 6, 3, 1, 4 (*d*) 4, 2, 5, 6, 3, 1

30. J C O P T E R
1 2 3 4 5 6 7
(*a*) 1, 3, 4, 5, 6, 7, 2 (*b*) 2, 6, 4, 5, 1, 3, 7
(*c*) 7, 6, 4, 5, 1, 3, 2 (*d*) 4, 7, 3, 1, 6, 2, 5

31. A C P E T S
1 2 3 4 5 6 **(Railways, 1995)**
(*a*) 1, 6, 3, 4, 2, 5 (*b*) 2, 3, 4, 1, 5, 6 (*c*) 5, 6, 3, 4, 1, 2 (*d*) 6, 5, 3, 4, 2, 1

32. R T A N U E
1 2 3 4 5 6
(*a*) 1, 3, 2, 6, 4, 5 (*b*) 3, 2, 4, 6, 1, 5 (*c*) 4, 3, 2, 5, 1, 6 (*d*) 4, 6, 5, 2, 3, 1

33. I N E T O C
1 2 3 4 5 6
(*a*) 2, 5, 4, 1, 6, 3 (*b*) 3, 6, 4, 1, 2, 5 (*c*) 4, 3, 6, 5, 2, 1 (*d*) 6, 5, 2, 3, 4, 1

34. T P S L O I
1 2 3 4 5 6
(*a*) 4, 6, 2, 5, 3, 1 (*b*) 2, 5, 4, 3, 6, 1 (*c*) 2, 6, 3, 1, 5, 4 (*d*) 3, 6, 4, 2, 5, 1

35. M F I A N E
1 2 3 4 5 6
(*a*) 1, 6, 2, 3, 4, 5 (*b*) 2, 4, 1, 3, 5, 6 (*c*) 5, 6, 2, 3, 1, 4 (*d*) 4, 2, 3, 1, 6, 5

36. N A E H L D
1 2 3 4 5 6
(*a*) 2, 6, 4, 3, 5, 1 (*b*) 4, 2, 1, 6, 5, 3 (*c*) 4, 3, 6, 5, 2, 1 (*d*) 2, 1, 6, 4, 3, 5

37. E T C K O P
1 2 3 4 5 6
(*a*) 3, 1, 4, 5, 6, 2 (*b*) 6, 5, 3, 4, 1, 2 (*c*) 2, 1, 6, 5, 3, 4 (*d*) 4, 1, 2, 3, 5, 6

38. E L G N I M
1 2 3 4 5 6
(*a*) 6, 5, 4, 3, 2, 1 (*b*) 3, 1, 2, 6, 5, 4 (*c*) 6, 5, 3, 2, 1, 4 (*d*) 3, 5, 6, 2, 1, 4

39. D A I M E N
1 2 3 4 5 6
(*a*) 1, 5, 4, 2, 3, 6 (*b*) 4, 5, 1, 2, 3, 6 (*c*) 4, 2, 3, 1, 5, 6 (*d*) 1, 2, 5, 6, 3, 4

40. R E S T L U
1 2 3 4 5 6
(*a*) 3, 4, 6, 1, 2, 5 (*b*) 4, 5, 3, 2, 6, 1 (*c*) 5, 6, 3, 4, 1, 2 (*d*) 6, 5, 2, 1, 4, 3

41. Which one word can be formed from the following letters ?
a a d e f g r s u **(C.B.I. 1993)**
(*a*) stagnation (*b*) safeguard (*c*) pseudo-grade (*d*) grandson

42. Which one word can be formed from the following letters ?
a a b c i l l n o o o r t **(C.B.I. 1993)**
(*a*) collapsible (*b*) locomotive (*c*) colourfulness (*d*) collaboration

43. The letters of the word NUMKIPP are in disorder. If they are arranged in proper order, the name of a vegetable is formed. What is the last letter of the word so formed ?

(*a*) K (*b*) M (*c*) N (*d*) P (*e*) U

44. If by arranging the letters of the word NABMODINT, the name of a game is formed, what are the first and the last letters of the word so formed ?

(*a*) B, T (*b*) B, N (*c*) N, D (*d*) A, T (*e*) M, T

45. If a meaningful word can be formed by rearranging the letters USCALA, the first letter of the word so formed is the answer. If no such word can be formed, the answer is X.

(*a*) C (*b*) S (*c*) A (*d*) L (*e*) U

46. If it is possible to form a word with the first, fourth, seventh and eleventh letters in the word 'SUPERFLUOUS', write the first letter of that word. Otherwise, X is the answer.

(*a*) S (*b*) L (*c*) O (*d*) E (*e*) X

47. If you pick up from the following alphabet, the sixth and the fourteenth letters from your right and then pick up the fifth and twentieth letters from your left and form a meaningful word, what is the first letter of that word ? **(Bank P.O. 1996)**

A B C D E F G H I J K L M
N O P Q R S T U V W X Y Z

(*a*) M (*b*) E (*c*) No word can be formed
(*d*) More than one word can be formed (*e*) None of these

48. If with the third, fourth, fifth, seventh and tenth letters of the word 'PERSONALITY', a meaningful word is formed, then first letter of the word is the answer. If no word is possible then X is the answer.

(*a*) O (*b*) T (*c*) R (*d*) S (*e*) X

49. If it is possible to make a meaningful word with the third, fifth, eighth and tenth letters of the word 'DISTRIBUTE', which of the following will be the third letter of that word ? If no such word can be made, give X as the answer and if more than one such word can be made, give M as the answer. **(Bank P.O. 1995)**

(*a*) S (*b*) R (*c*) E (*d*) X (*e*) M

50. If we make a meaningful word with the first, fourth, ninth and fourteenth letters of the word 'ADMINISTRATION', which of the following will be the third letter of that word from the right end of that word ?

(*a*) A (*b*) I (*c*) N (*d*) R (*e*) None of these

51. If it is possible to make a meaningful word with the second, the fifth and the eighth letters of the word 'CARETAKER', which of the following will be the first letter of that word ? If no such word can be made, give X as the answer. If more than one such word can be made, give M as the answer. **(Bank P.O. 1994)**

(*a*) A (*b*) E (*c*) T (*d*) X (*e*) M

52. A meaningful word starting with A is made from the first, the second, the fourth, the fifth and the sixth letters of the word 'CONTRACT'. Which of the following is the middle letter of the word ?

(*a*) C (*b*) O (*c*) R (*d*) T (*e*) None of these

53. A meaningful word is made if we take the first, fourth, fifth, seventh, tenth, eleventh and the twelfth letters of the word 'FELICITATIONS'. Which of the following will be the fifth letter of that word from the right end of that word ?

(*a*) T (*b*) C (*c*) N (*d*) I (*e*) None of these

(U.T.I. 1993)

54. If it is possible to make a meaningful word with the fourth, the eighth and the tenth letters of the word 'COUNTERACT', which of the following will be the last letter of that word ? If no such word can be made, give X as the answer. If more than one such word can be made, give M as the answer.

(*a*) A (*b*) N (*c*) T (*d*) X (*e*) M

55. If it is possible to make a meaningful word with the first, the fourth, the seventh and the eleventh letters of the word 'INTERPRETATION', which of the following will be third letter of that word ? If more than one such word can be made, give M as the answer and if no such word can be made, give X as the answer.

(*a*) I (*b*) R (*c*) T (*d*) X (*e*) M

(S.B.I.P.O. 1997)

56. If it is possible to make a meaningful word out of the second, the fourth, the fifth and the eighth letters of the word 'ILLOGICAL' then which of the following will be the third letter of the so formed word ? If more than one word can be formed then give X as the answer. If no meaningful word can be formed, then give Z as the answer. **(L.I.C. 1994)**

(*a*) A (*b*) G (*c*) O (*d*) X (*e*) Z

57. If it is possible to make a meaningful word with the second, the fifth, the tenth and the twelfth letters of the word 'METROPOLITAN', which of the following will be the third letter of that word ? If no such word can be made give X as the answer and if more than one such word can be made, give M as the answer.

(*a*) N (*b*) Q (*c*) T (*d*) X (*e*) M

58. If it is possible to make a meaningful word with the third, the fifth, the seventh and the tenth letters of the word 'PROJECTION' which of the following is the third letter of that word ? If no such word can be made, give X as the answer. If more than one such word can be made, give M as the answer.

(*a*) O (*b*) N (*c*) T (*d*) X (*e*) M

(Bank P.O. 1995)

59. If it is possible to make a meaningful word with the fourth, the seventh, the eleventh and the thirteenth letters of the word 'CATEGORISATION' which of the following will be the first letter of that word ? If no such word can be made, give X as the answer. If more than one such word can be made, give M as the answer. **(Bank P.O. 1995)**

(*a*) O (*b*) R (*c*) T (*d*) X (*e*) M

60. If it is possible to make a meaningful word with the first, the third, the seventh and the ninth letters of the word SEPARATION, which of the following will be the third letter of that word ? If no such word can be made, give X as the answer and if more than one such word can be made, give M as the answer.

(*a*) O (*b*) P (*c*) T (*d*) X (*e*) M

ANSWERS

1. (*b*) : FRUIT	**2.** (*b*) : CHASTE	**3.** (*d*) : MAGNET
4. (*c*) : CARTON	**5.** (*b*) : ENIGMA	**6.** (*c*) : FRIEND
7. (*d*) : TACKLE	**8.** (*c*) : SUGAR	**9.** (*b*) : MUSCLE
10. (*b*) : BRANCH	**11.** (*a*) : GAMBLE	**12.** (*d*) : AUTHOR
13. (*c*) : MENTAL	**14.** (*c*) : HANKER	**15.** (*b*) : SIGNAL
16. (*a*) : PLANET	**17.** (*b*) : PRIDE	**18.** (*b*) : POLICE
19. (*c*) : NUMBER	**20.** (*c*) : ARDENT	**21.** (*b*) : PHRASE
22. (*c*) : CASTLE	**23.** (*d*) : DOCILE	**24.** (*b*) : REMAND
25. (*b*) : BRIGHT	**26.** (*d*) : TRACE	**27.** (*b*) : MARVEL
28. (*c*) : DEPORT	**29.** (*b*) : THRONE	**30.** (*d*) : PROJECT
31. (*a*) : ASPECT	**32.** (*c*) : NATURE	**33.** (*a*) : NOTICE
34. (*c*) : PISTOL	**35.** (*b*) : FAMINE	**36.** (*b*) : HANDLE
37. (*b*) : POCKET	**38.** (*a*) : MINGLE	**39.** (*c*) : MAIDEN
40. (*c*) : LUSTRE	**41.** (*b*)	**42.** (*d*)

43. (*c*) : The name of the vegetable is PUMPKIN. The last letter is N.

44. (*b*) : The name of the game is BADMINTON. The first and last letters are B and N respectively.

45. (*a*) : The word is CASUAL. The first letter is C.

46. (*b*) : The first, fourth, seventh and eleventh letters of the word SUPERFLUOUS are S, E, L and S respectively. The word formed is LESS. The first letter is L.

47. (*a*) : The sixth and fourteenth letters from the right are U and M respectively. The fifth and twentieth letters from the left are E and T respectively. Clearly, the word formed is MUTE. So, the first letter is M.

48. (*c*) : The third, fourth, fifth, seventh and tenth letters of the word PERSONALITY are R, S, O, A and T respectively. The word formed is ROAST. So, the first letter is R.

49. (*b*) : The third, fifth, eighth and tenth letters of the word DISTRIBUTE are S, R, U and E respectively. The word formed is SURE and its third letter is R.

50. (*a*) : The first, fourth, ninth and fourteenth letters of the word ADMINISTRATION are A, I, R and N respectively. The word formed is RAIN. The third letter from the right end is A.

51. (*e*) : The second, fifth and eighth letters of the word CARETAKER are A, T and E respectively. The words formed are EAT, ATE and TEA.

52. (*d*) : The first, second, fourth, fifth and sixth letters of the word 'CONTRACT' are C, O, T, R, A respectively. The word formed is ACTOR, in which the middle letter is T.

53. (*b*) : The first, fourth, fifth, seventh, tenth, eleventh and twelfth letters of the word FELICITATIONS are F, I, C, T, I, O, N respectively. The word formed is FICTION. The fifth letter from the right is C.

54. (*e*) : The fourth, eighth and tenth letters of the word COUNTERACT are N, A and T respectively. The words formed are ANT and TAN.

55. (*e*) : The first, fourth, seventh and eleventh letters of the word INTERPRETATION are I, E, R and T respectively. The words formed are TIER, RITE and TIRE.

56. (*d*) : The second, fourth, fifth and eighth letters of the word ILLOGICAL are L, O, G, A respectively. The words formed are GOAL and GAOL.

57. (*e*) : The second, fifth, tenth and twelfth letters of the word METROPOLITAN are E, O, T and N respectively. The words formed are NOTE and TONE.

58. (*e*) : The third, fifth, seventh and tenth letters of the word PROJECTION are O, E, T and N respectively. The words formed are NOTE and TONE.

59. (*e*) : The fourth, seventh, eleventh and thirteenth letters of the word CATEGORISATION are E, R, T and O respectively. The words formed are TORE and ROTE.

60. (*e*) : The first, third, seventh and ninth letters of the word SEPARATION are S, P, T and O respectively. The words formed are SPOT, POTS and TOPS.

EXERCISE 10I

Directions : ***In each of the following questions, find which one word cannot be made from the letters of the given word.***

1. CARPENTER
(*a*) NECTAR (*b*) CARPET (*c*) PAINTER (*d*) REPENT

2. TEACHERS **(I. Tax & Central Excise, 1995)**
(*a*) REACH (*b*) CHAIR (*c*) CHEER (*d*) SEARCH

3. CONSOLIDATE
(*a*) LENTIL (*b*) SLAIN (*c*) CONDOLE (*d*) DETAIL

4. UNIFORMITY **(S.S.C. 1994)**
(*a*) TINY (*b*) TORN (*c*) RENT (*d*) FORM

5. KALEIDOSCOPE
(*a*) SCALE (*b*) PADLOCK (*c*) PACKET (*d*) DIESEL

6. RECREATION **(Assistant Grade, 1994)**
(*a*) RATION (*b*) ACTION (*c*) TORN (*d*) REFER

7. SUPERIMPOSABLE
(*a*) SPIRE (*b*) REPTILE (*c*) POSSIBLE (*d*) REPOSURE

8. COMMENTATOR **(C.B.I. 1995)**
(*a*) TART (*b*) COMMON (*c*) MOMENT (*d*) COSMOS

9. MIRACULOUS
(*a*) MOLAR (*b*) LOCUS (*c*) SOLACE (*d*) SCAR

10. REASONABLE **(S.S.C. 1992)**
(*a*) BRAIN (*b*) BONES (*c*) NOBLE (*d*) ARSON

11. TRIBUNAL
(*a*) LATIN (*b*) BRAIN (*c*) URBAN (*d*) TRIBLE

12. TEMPERAMENT **(S.S.C. 1995)**
(*a*) METER (*b*) PETER (*c*) TENTER (*d*) TESTER

13. KNOWLEDGE
(*a*) WEDGE (*b*) GODOWN (*c*) KLEEN (*d*) GOLDEN

14. CONTEMPORARY **(Central Excise, 1995)**
(*a*) PARROT (*b*) COMPANY (*c*) CARPENTER (*d*) PRAYER

15. REFRIGERATE
(*a*) REFER (*b*) REGRET (*c*) REGENERATE (*d*) FREE

16. PARAPHERNALIA **(C.B.I. 1994)**
(*a*) RENAL (*b*) PRAISE (*c*) RAPHAEL (*d*) PEAR

17. OBSTETRICIAN
(*a*) SOBER (*b*) TERMITE (*c*) RETAIN (*d*) SIREN

18. UNCONSCIOUS **(S.S.C. 1994)**
(*a*) SON (*b*) COIN (*c*) SUN (*d*) NOSE

19. TURBULENCE
(*a*) CART (*b*) BLUE (*c*) RENT (*d*) LENT

20. TRANQUILITY **(S.S.C. 1994)**
(*a*) QUILT (*b*) TRINITY (*c*) TRAIN (*d*) TRIANGLE

21. INTERNATIONAL
(*a*) ORIENTAL (*b*) TERMINAL (*c*) LATTER (*d*) RATIONALE

22. ORGANISATION **(Assistant Grade, 1994)**
(*a*) NATION (*b*) GRANT (*c*) RECOGNISE (*d*) SATAN

23. VARIEGATED
(*a*) TRAVEL (*b*) TRADE (*c*) GREAT (*d*) RIGVEDA

24. DISSEMINATION **(C.B.I. 1995)**
(*a*) INDIA (*b*) NATIONS (*c*) MENTION (*d*) ACTION

25. CREDENTIAL
(*a*) DENTAL (*b*) CREATE (*c*) TRAIN (*d*) CREAM

26. REPRIMAND **(S.S.C. 1996)**
(*a*) MAIDEN (*b*) REPAIR (*c*) MUNDANE (*d*) REMAND

27. COLLABORATION
(*a*) BRITAIN (*b*) COLORATION (*c*) ROBOT (*d*) LEBARIN

28. PROGNOSTICATION **(S.S.C. 1993)**
(*a*) RONTGEN (*b*) START (*c*) SPITOON (*d*) ROGATION

29. DEPARTMENT
(*a*) ENTER (*b*) PERMIT (*c*) TEMPER (*d*) RENTED

30. DISAPPOINTMENT **(S.S.C. 1994)**
(*a*) POINT (*b*) OINTMENT (*c*) TENAMENT (*d*) POSITION

31. QUESTIONNAIRE
(*a*) QUESTOR (*b*) QUEUE (*c*) QUINATE (*d*) QUERIES

32. PHARMACEUTICAL **(C.B.I. 1995)**
(*a*) PRACTICE (*b*) METRIC (*c*) RHEUMATIC (*d*) CRITICAL

33. ADULTERATION
(*a*) RETURN (*b*) RELATION (*c*) RETAIL (*d*) TOILET

34. ENDEAVOUR **(S.S.C. 1995)**
(*a*) DROVE (*b*) DEVOUR (*c*) DROWN (*d*) ROUND

35. INTELLIGENCE
(*a*) CANCEL (*b*) INCITE (*c*) GENTLE (*d*) NEGLECT

36. THERMOLYSIS **(S.S.C. 1993)**
(*a*) LOITER (*b*) LORIS (*c*) LOTUS (*d*) SISTER

37. FLEXIGERATOR
(*a*) TAXI (*b*) GREATER (*c*) LARGER (*d*) XEROX

38. CHOREOGRAPHY **(C.B.I. 1994)**
(*a*) OGRE (*b*) PHOTOGRAPHY (*c*) GRAPH (*d*) GEOGRAPHY

39. CONSTITUTIONAL
(*a*) LOCATION (*b*) TUITION (*c*) TALENT (*d*) CONSULT

40. ETHNOGRAPHIC **(S.S.C. 1993)**
(*a*) HEART (*b*) GEAR (*c*) EARTH (*d*) GARMENT

41. TRANSLOCATION
(*a*) TALCUM (*b*) COAL (*c*) START (*d*) CARTON

42. SIGNIFICANT
(*a*) GIANT (*b*) INSIGNIA (*c*) INFANT (*d*) NASCENT

43. GERMINATION
(*a*) ORNAMENT (*b*) TERMINAL (*c*) IGNITE (*d*) NIGER

44. TOURNAMENT
(*a*) NORMAN (*b*) ROTTEN (*c*) MANOUEVRE (*d*) MANNER

45. CORRESPONDING
(*a*) DISCERN (*b*) GRINDER (*c*) DROOP (*d*) SUPERIOR

46. CHROMATOGRAPHIC
(*a*) PRAGMATIC (*b*) PHOTO (*c*) GOTHAM (*d*) MARGIN

Directions : ***In each of the following questions, choose one word which can be formed from the letters of the given word.***

47. CHOCOLATE **(I. Tax & Central Excise, 1994)**
(*a*) TELL (*b*) HEALTH (*c*) LATE (*d*) COOLER

48. MEASUREMENT **(S.S.C. 1995)**
(*a*) MASTER (*b*) MANTLE (*c*) SUMMIT (*d*) ASSURE

49. RHINOCEROS **(Central Excise, 1994)**
(*a*) RENAL (*b*) HIND (*c*) SURE (*d*) HORSE

50. RECOMMENDATION
(*a*) MEDIATE (*b*) MEDICINE (*c*) REMINDER (*d*) COMMUNICATE

51. QUINTESSENCE
(*a*) SCOT (*b*) QUOTE (*c*) QUITE (*d*) ESTEEM

52. VENTURESOME **(I. Tax, 1994)**
(*a*) ROSTRUM (*b*) SERMON (*c*) TRAVERSER (*d*) SEVENTEEN

53. CONSTANTINOPLE
(*a*) CONTINUE (*b*) CONSCIENCE (*c*) CONSTANCE (*d*) CONTENT

ANSWERS

1. (*c*)	**2.** (*b*)	**3.** (*a*)	**4.** (*c*)	**5.** (*c*)	**6.** (*d*)	**7.** (*b*)	**8.** (*d*)	**9.** (*c*)
10. (*a*)	**11.** (*d*)	**12.** (*d*)	**13.** (*b*)	**14.** (*c*)	**15.** (*c*)	**16.** (*b*)	**17.** (*b*)	**18.** (*d*)
19. (*a*)	**20.** (*d*)	**21.** (*b*)	**22.** (*c*)	**23.** (*a*)	**24.** (*d*)	**25.** (*d*)	**26.** (*c*)	**27.** (*a*)
28. (*a*)	**29.** (*b*)	**30.** (*c*)	**31.** (*b*)	**32.** (*d*)	**33.** (*a*)	**34.** (*c*)	**35.** (*a*)	**36.** (*c*)
37. (*d*)	**38.** (*b*)	**39.** (*c*)	**40.** (*d*)	**41.** (*a*)	**42.** (*d*)	**43.** (*b*)	**44.** (*c*)	**45.** (*d*)
46. (*d*)	**47.** (*c*)	**48.** (*a*)	**49.** (*d*)	**50.** (*a*)	**51.** (*c*)	**52.** (*b*)	**53.** (*d*)	

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. 1997)**

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 (*b*) 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 [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

Clearly, there are three such numbers. Hence, the answer is (*c*).

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 (*b*) 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 [6] 7 6 [8] 9 3 2 7 5 3 4 2 [2] 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 (*b*) 5 (*c*) 6 (*d*) 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 [5 3] [8 6] 2 1 7 1 4 [1 3] 2 [8 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 which are exactly 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 (*b*) 2 (*c*) 3 (*d*) 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 [8] 4 [8] 4 2 2 [8] 2 6 9 8 4 5 4 8 3 2 [8] 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
(*a*) One (*b*) 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 (*b*) 3 (*c*) 2 (*d*) 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 (*b*) 4 (*c*) 5 (*d*) 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 (*b*) One (*c*) Two (*d*) 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.B.I. 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 (*b*) 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 (*b*) 3 (*c*) 4 (*d*) 5 (*e*) None of these

10. Which figures have equal frequency ?
(*a*) 253 (*b*) 245 (*c*) 375 (*d*) 865 (*e*) None of these

11. How many 6's 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

(*a*) One (*b*) Two (*c*) Three (*d*) Four (*e*) 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 1 7 3 7 7 1 3 3 1 7 3 8 5 7 1 3 7 7 1 7 3 9 0 6

(*a*) 3 (*b*) 4 (*c*) 5

(*d*) More than 5 (*e*) None of these **(S.B.I.P.O. 1991)**

13. 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 alternate numbers have a difference of 2 ? **(C.A.T. 1997)**

(*a*) One (*b*) Two (*c*) Three (*d*) 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 1 9

(*a*) One (*b*) Three (*c*) Five (*d*) Six (*e*) None of these

Directions (*Questions 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 ?

(*a*) 1 (*b*) 2 (*c*) 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 ?

(*a*) 1 (*b*) 2 (*c*) 3 (*d*) 4 (*e*) 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 ?

(*a*) 1 (*b*) 2 (*c*) 3 (*d*) 4 (*e*) 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

(*a*) Nil (*b*) One (*c*) Two (*d*) Three (*e*) 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

(*a*) One (*b*) Two (*c*) Three (*d*) Four (*e*) 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)**

(*a*) 19 (*b*) 21 (*c*) 22

(*d*) They will not call out the same number (*e*) 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)**

(*a*) 1 (*b*) 4 (*c*) 7 (*d*) 8 (*e*) 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)**

(*a*) 2 (*b*) 6 (*c*) 7 (*d*) 8 (*e*) 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 ? **(I.A.S. 1994)**

(*a*) 4 (*b*) 5 (*c*) 6 (*d*) 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)**

(*a*) 10 (*b*) 12 (*c*) 15 (*d*) 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

(*a*) Wait (*b*) Sit (*c*) Go (*d*) Stop (*e*) Run

26. In a school, the following codes were used during physical exercise. '1' means 'start walking', '2' means 'keep standing', '3' means 'start running at the same spot', '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

(*a*) 2 (*b*) 3 (*c*) 4 (*d*) 5 (*e*) 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)**

(*a*) 18 (*b*) 21 (*c*) 24 (*d*) 27 (*e*) 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 ?

(*a*) 35 (*b*) 45 (*c*) 50 (*d*) 60 (*e*) None of these **(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 ?

(*a*) 7 (*b*) 10 (*c*) 20 (*d*) 21 (*e*) 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)**

(*a*) 8 (*b*) 6 (*c*) 5 (*d*) Nil

31. How many numbers from 11 to 50 are there which are exactly divisible by 7 but not by 3 ?

(*a*) Two (*b*) Four (*c*) Five (*d*) 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 (*b*) 6 (*c*) 7 (*d*) 8 (*e*) 9

ANSWERS

1. (*b*) : 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. (*b*) : 9 [3] 6 6 3 9 5 9 [3] 7 8 9 1 6 3 9 6 3 9

3. (*a*) : 5 7 2 6 5 7 3 8 3 [7] 3 2 5 7 2 [7] 3 4 8 2 6 7 8

4. (*c*) : 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

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

6. (*b*) : [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

7. (*d*) : 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

8. (*c*) : 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

9. (*a*) : 7 8 9 [7] 6 5 3 4 2 8 9 7 2 4 5 9 2 9 [7] 6 4 7

10. (*d*) : In the given series, 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.e.*, 2.

11. (*b*) : 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

12. (*a*) : 2 9 7 3 [1 7 3] 7 7 1 3 3 [1 7 3] 8 5 7 1 3 7 7 [1 7 3] 9 0 6

13. (*b*) : 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 [6] 7 6 [8] 9 3 2 7 5 3 4 2 [2] 3 5 5 2 2 [8] 1 1 9

15. (*e*) : 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

16. (*c*) : 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

17. (*d*) : 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

18. (*c*) : 12, 19, 21, [3], 25, 18, 35, 20, 22, [21], 45, 46, 47, 48, 9, 50, 52, 54, 55, 56

19. (*b*) : 3 8 4 1 5 7 2 [8] 3 4 [8] 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 25...
Clearly, both will never call out the same number.

21. (*d*) : 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 $\Rightarrow$ T = 9.
T – N = 3 and T = 9 $\Rightarrow$ 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 S S C S S S | S 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 [4] 2 3 1 [4 4] 3 2 2 1 2 [4] 3 1 [4 4] 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, 50, 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.
$\therefore$ The required numbers are 4, 24, 40, 44, 48, 64, 84. Clearly, there are 7 such numbers.

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

31. (*b*) : 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.
$\therefore$ 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 (*b*) 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
(*iii*) 37 students who have rank lower than Rahul.
i.e., $(8 + 1 + 37) = 46$ students.
Hence, the answer is (*b*).

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 ?

(*a*) 9th (*b*) 10th (*c*) 11th (*d*) 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

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 (*c*) 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)**

(*a*) 20th (*b*) 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.S.R.B. 1998)**

(*a*) 64 (*b*) 65 (*c*) 66

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

4. Sanjeev 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 (*b*) 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 (*d*) 20 (*e*) 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 (*b*) 44 (*c*) 50 (*d*) 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 ?

(*a*) 25 (*b*) 23 (*c*) 21 (*d*) 19 (*e*) 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 (*b*) 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 ?

(*a*) 20th and 24th (*b*) 24th and 20th (*c*) 25th and 21st
(*d*) 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 (*b*) 15th (*c*) 16th (*d*) 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 (*b*) 7 (*c*) 12 (*d*) 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 ? **(S.S.C. 1995)**

(*a*) First (*b*) Second (*c*) Fourth (*d*) 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 Vijay be ahead of Jack and there be 48 persons in the queue, how many persons are there between Vijay and Mary ? **(M.B.A. 1994)**

(*a*) 8 (*b*) 7 (*c*) 6 (*d*) 5 (*e*) 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 ?

(*a*) 25 (*b*) 26 (*c*) 27
(*d*) 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 (*b*) 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 (*b*) 8th (*c*) 14th (*d*) 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 (*b*) 17th (*c*) 21st
(*d*) 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. (*b*) : 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. (*a*) : Clearly, number of students in the class = (15 + 1 + 48) = 64.

4. (*d*) : Clearly, number of students in the class = (6 + 1 + 27) = 34.

5. (*b*) : 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 + 1 + 28) = 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) = 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 $x = 20$.
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. (*b*) : 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.e.*, at the eighth position.
So, number of persons between Vijay and Mary = 7.

14. (*b*) : 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.

15. (*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 *i.e.*, fifth from left.
∴ Mona's position from the right = (18 − 4) = 14th.

17. (*b*) : Since Kapil and Nikunj interchange places, so Nikunj's 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.e.*, 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 *i.e.*, 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 : $\overset{3}{\longleftarrow}$ C $\overset{8}{\longleftrightarrow}$ B $\overset{5}{\longleftrightarrow}$ A $\overset{21}{\longrightarrow}$
Clearly, number of persons in the queue = (3 + 1 + 8 + 1 + 5 + 1 + 21) = 40.

Case II : $\overset{3}{\longleftarrow}$ C A $\overset{5}{\longleftrightarrow}$ B
8
21
Number of persons between A and C = (8 − 6) = 2.
Clearly, number of persons in the queue = (3 + 1 + 2 + 1 + 21) = 28.
Now, 28 < 40. So, 28 is the minimum number of persons in the queue.

TYPE 3 : TIME SEQUENCE TEST

Ex. 1. Satish remembers that his brother's birthday is after fifteenth but before eighteenth of February whereas his sister Kajal 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. 1996)**
(*a*) 16th (*b*) 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 *i.e.*, 17th February.
Hence, the answer is (*b*).

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. (*b*) 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 (*b*) 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 (*b*) Tuesday (*c*) Wednesday (*d*) 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 *i.e.*, 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 *e.g.*, 1980, 1984, 1988, 1992, 1996,... They have 366 days.

(*iii*) February in a leap year has 29 days.

(*iv*) 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 (*b*) 21st May (*c*) 22nd May

(*d*) 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 (*b*) 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 ? **(B.S.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. (*b*) 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. (*b*) 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 hours, Anuj found himself half an hour earlier than the man who was 40 minutes late. What was the scheduled time of the meeting ? **(S.S.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.S.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 (*b*) 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 (*b*) 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 of ten 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 ? **(C.B.I. 1995)**

(*a*) 10.00 A.M. — 12 noon (*b*) 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 he 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. (*b*) 5 p.m. (*c*) 6 p.m. (*d*) None of these

Directions (*Questions 12 to 14*) : *Study the following information carefully and answer the 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 (*b*) 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 (*b*) 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' 1993)**

16. If the day before yesterday was Saturday, what day will fall on the day after tomorrow ? **(C.B.I. 1993)**
(*a*) Friday (*b*) 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 (*b*) Saturday (*c*) Sunday (*d*) 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 (*b*) 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 (*b*) 24.12.91 (*c*) 26.12.91 (*d*) 31.12.91
(C.B.I. 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 ? **(Railways, 1994)**
(*a*) Two (*b*) 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 (*b*) 4 (*c*) 5 (*d*) 6

22. If 1st October is Sunday, then 1st November will be **(C.A.T. 1997; R.R.B. 1998)**

(*a*) Monday (*b*) Tuesday (*c*) Wednesday (*d*) Thursday

23. If 3rd December, 1990 is Sunday, what day is 3rd January, 1991 ? **(S.S.C. 1994)**

(*a*) Tuesday (*b*) Wednesday (*c*) Thursday (*d*) Friday

24. If February 1, 1996 is Wednesday, what day is March 3, 1996 ? **(M.B.A. 1996)**

(*a*) Monday (*b*) Sunday (*c*) Saturday (*d*) 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)**

(*a*) Monday (*b*) Friday (*c*) Saturday (*d*) Sunday

26. If 18th February, 1997 falls on Tuesday then what will be the day on 18th February, 1999 ? **(Railways, 1998)**

(*a*) Monday (*b*) Tuesday (*c*) Thursday (*d*) Friday

27. How many days will there be from 26th January, 1996 to 15th May, 1996 (both days included) ?

(*a*) 110 (*b*) 111 (*c*) 112 (*d*) 113 (*e*) None of these

28. Which two months in a year have the same calendar ?

(*a*) June, October (*b*) April, November

(*c*) April, July (*d*) October, December

ANSWERS

1. (*b*) : 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. (*d*) : According to Sangeeta, the father's birthday falls on one of the days among 9th, 10th, 11th and 12th December. According to Natasha, the father's birthday falls on one of the days among 10th, 11th, 12th and 13th December.

The days common to both the groups are 10th, 11th and 12th December. So, the father's birthday falls on any one of these days.

3. (*c*) : Clearly, according to Sunita, the distance was more than 12 kms but less than 14 kms, which is 13 kms.

4. (*b*) : 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. (*e*) : 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. (*b*) : 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. (*b*) : Clearly, the last bell rang 45 minutes before 7.45 a.m. *i.e.*, 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. (*b*) : Clearly, the computers would be used most when all the three groups are working simultaneously and this 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.

Questions 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.	N	K		K, N	N		K, N
2 p.m. to 4 p.m.		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. (*b*) : 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. (*b*) : 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. (*b*) : 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)
(*b*) 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)
(*d*) 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', 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.*, **B**rackets, **O**f, **D**ivision, **M**ultiplication, **A**ddition, **S**ubtraction.

e.g., $(36 - 12) \div 4 + 6 + 2 \times 3 = 24 \div 4 + 6 + 2 \times 3$ (Solving Bracket)
$= 6 + 3 \times 3$ (Solving Division)
$= 6 + 9$ (Solving Multiplication)
$= 15$ (Solving Addition)

ILLUSTRATIVE EXAMPLES

Ex. 1. If '+' means 'divided by', '–' means 'multiplied by', '×' means 'minus' and '÷' means 'plus', which of the following will be the value of the expression $16 \div 8 - 4 + 2 \times 4$? **(Bank P.O. 1995)**

(*a*) 16 (*b*) 28 (*c*) 32 (*d*) 44 (*e*) None of these

Sol. Putting the proper signs in the given expression, we get :
$16 + 8 \times 4 \div 2 - 4 = 16 + 8 \times 2 - 4 = 16 + 16 - 4 = 32 - 4 = 28.$
So, the answer is (*b*).

Ex. 2. If + means ÷, – means ×, ÷ means + and × means –, then
$36 \times 12 + 4 \div 6 + 2 - 3 = ?$

(*a*) 2 (*b*) 18 (*c*) 42 (*d*) $6\frac{1}{2}$ (*e*) None of these

Sol. Using the proper signs, we get :
$36 - 12 \div 4 + 6 \div 2 \times 3 = 36 - 3 + 3 \times 3 = 36 - 3 + 9 = 45 - 3 = 42.$
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 (*b*) 25 (*c*) 27 (*d*) 45 (*e*) None of these

Sol. Using the proper signs, we get :
Given expression $= 18 + 12 \div 6 \times 2 - 5 = 18 + 2 \times 2 - 5$
$= 18 + 4 - 5 = 22 - 5 = 17.$
So, the answer is (*e*).

Ex. 4. If × stands for −, ÷ stands for +, + stands for ÷ and − stands for ×, which one of the following equations is correct ? **(S.S.C. 1996)**

(*a*) $15 - 5 \div 5 \times 20 + 10 = 6$ (*b*) $8 \div 10 - 3 + 5 \times 6 = 8$

(*c*) $6 \times 2 + 3 \div 12 - 3 = 15$ (*d*) $3 \div 7 - 5 \times 10 + 3 = 10$

Sol. Using the proper signs, we get :

Expression in (*a*) $= 15 \times 5 + 5 - 20 \div 10 = 15 \times 5 + 5 - 2 = 75 + 5 - 2 = 78.$

Expression in (*b*) $= 8 + 10 \times 3 \div 5 - 6 = 8 + 10 \times \frac{3}{5} - 6 = 8 + 6 - 6 = 8.$

Expression in (*c*) $= 6 - 2 \div 3 + 12 \times 3 = 6 - \frac{2}{3} + 36 = 42 - \frac{2}{3} = \frac{124}{3}.$

Expression in (*d*) $= 3 + 7 \times 5 - 10 \div 3 = 3 + 7 \times 5 - \frac{10}{3} = 3 + 35 - \frac{10}{3} = \frac{104}{3}.$

∴ Statement (*b*) is true.

Ex. 5. It being given that : > denotes +, < denotes −, + denotes ÷, − denotes =, = denotes 'less than' and × denotes 'greater than', find which of the following is a correct statement.

(*a*) $3 + 2 > 4 = 9 + 3 < 2$ (*b*) $3 > 2 > 4 = 18 + 3 < 1$

(*c*) $3 > 2 < 4 \times 8 + 4 < 2$ (*d*) $3 + 2 < 4 \times 9 + 3 < 3$

Sol. Using proper notations, we have :

(*a*) Given statement is $3 \div 2 + 4 < 9 \div 3 - 2$ or $\frac{11}{2} < 1$, which is not true.

(*b*) Given statement is $3 + 2 + 4 < 18 \div 3 - 1$ or $9 < 5$, which is not true.

(*c*) Given statement is $3 + 2 - 4 > 8 \div 4 - 2$ or $1 > 0$, which is true.

(*d*) Given statement is $3 \div 2 - 4 > 9 \div 3 - 3$ or $-\frac{5}{2} > 0$, which is not true.

So, the statement (*c*) is true.

EXERCISE 12A

1. If × stands for 'addition', ÷ stands for 'subtraction', + stands for 'multiplication' and − stands for 'division', then

$20 \times 8 \div 8 - 4 + 2 = ?$ **(Transmission Executives' 1994)**

(*a*) 80 (*b*) 25 (*c*) 24 (*d*) 5

2. If − means ×, × means +, + means ÷ and ÷ means −, then

$40 \times 12 + 3 - 6 \div 60 = ?$ **(Bank P.O. 1993)**

(*a*) 7.95 (*b*) 16 (*c*) 44 (*d*) 479.95 (*e*) None of these

3. If + means ÷, × means −, ÷ means × and − means +, then

$8 + 6 \times 4 \div 3 - 4 = ?$ **(Bank P.O. 1994)**

(*a*) − 12 (*b*) $-\frac{20}{3}$ (*c*) 12 (*d*) $\frac{20}{3}$ (*e*) None of these

4. If × means ÷, − means ×, ÷ means + and + means −, then

$(3 - 15 \div 19) \times 8 + 6 = ?$ **(Assistant Grade, 1998)**

(*a*) 8 (*b*) 4 (*c*) 2 (*d*) − 1

5. If + means ×, ÷ means −, × means + and − means ÷, what will be the value of $4 + 11 \div 5 - 55 = ?$ **(L.I.C. 1994)**

(*a*) − 48.5 (*b*) − 11 (*c*) 79 (*d*) 91 (*e*) None of these

6. If × means +, ÷ means −, − means × and + means ÷, then
$8 \times 7 - 8 + 40 \div 2 = ?$ **(Bank P.O. 1998)**

(*a*) 1 (*b*) $7\frac{2}{5}$ (*c*) $8\frac{3}{5}$ (*d*) 44 (*e*) None of these

7. If + means −, − means ×, × means ÷ and ÷ means +, then
$15 \times 3 \div 15 + 5 - 2 = ?$ **(S.B.I.P.O. 1994)**

(*a*) 0 (*b*) 6 (*c*) 10 (*d*) 20 (*e*) None of these

8. If × means −, + means ÷, − means × and ÷ means +, then
$15 - 2 \div 900 + 90 \times 100 = ?$ **(B.S.R.B. 1995)**

(*a*) 190 (*b*) 180 (*c*) 90 (*d*) 0 (*e*) None of these

9. If + means ÷, − means ×, ÷ means −, × means +, what will be the value of $8 \div 6 + 4 - 7 \times 3$?

(*a*) $-\frac{71}{3}$ (*b*) $-\frac{23}{2}$ (*c*) 12 (*d*) 14 (*e*) None of these

10. If ÷ means +, − means ÷, × means − and + means ×, then
$$\frac{(36 \times 4) - 8 \times 4}{4 + 8 \times 2 + 16 \div 1} = ?$$

(*a*) 0 (*b*) 8 (*c*) 12 (*d*) 16

11. If P denotes ÷, Q denotes ×, R denotes + and S denotes −, then
18 Q 12 P 4 R 5 S 6 = ?

(*a*) 36 (*b*) 53 (*c*) 59 (*d*) 65 (*e*) None of these

12. If *a* means 'plus', *b* means 'minus', *c* means 'multiplied by' and *d* means 'divided by', then 18 *c* 14 *a* 6 *b* 16 *d* 4 = ? **(B.S.R.B. 1996)**

(*a*) 63 (*b*) 254 (*c*) 288 (*d*) 1208 (*e*) None of these

13. If A means −, B means ÷, C means + and D means ×, then
15 B 3 C 24 A 12 D 2 = ? **(Bank P.O. 1996)**

(*a*) 34 (*b*) 2 (*c*) $\frac{5}{9}$ (*d*) $-23\frac{4}{9}$ (*e*) None of these

14. If *x* stands for 'add', *y* stands for 'subtract', *z* stands for 'divide' and *p* stands for 'multiply', then what is the value of (7 *p* 3) *y* 6 *x* 5 ? **(U.D.C. 1994)**

(*a*) 5 (*b*) 10 (*c*) 15 (*d*) 20

15. If A stands for +, B stands for −, C stands for ×, then what is the value of (10 *C* 4) *A* (4 *C* 4) *B* 6 ? **(Assistant Grade, 1992)**

(*a*) 60 (*b*) 56 (*c*) 50 (*d*) 46

16. If L denotes ×, M denotes ÷, P denotes + and Q denotes −, then
16 P 24 M 8 Q 6 M 2 L 3 = ?

(*a*) $\frac{13}{6}$ (*b*) $-\frac{1}{6}$ (*c*) $14\frac{1}{2}$ (*d*) 10 (*e*) None of these

17. If − means ÷, + means ×, ÷ means −, × means +, then which of the following equations is correct ? **(C.B.I. 1997)**

(*a*) $52 \div 4 + 5 \times 8 - 2 = 36$ (*b*) $43 \times 7 \div 5 + 4 - 8 = 25$

(*c*) $36 \times 4 - 12 + 5 \div 3 = 420$ (*d*) $36 - 12 \times 6 \div 3 + 4 = 60$

18. If × means 'addition', − means 'division', ÷ means 'subtraction' and + means 'multiplication', then which of the following equations is correct ? **(S.S.C. 1996)**

(a) $16 \times 5 \div 10 + 4 - 3 = 19$ (b) $16 + 5 \div 10 \times 4 - 3 = 9$

(c) $16 + 5 - 10 \times 4 \div 3 = 9$ (d) $16 - 5 \times 10 \div 4 + 3 = 12$

19. If + stands for 'division', × stands for 'addition', − stands for 'multiplication' and ÷ stands for 'subtraction', then which of the following equations is correct ?

(a) $36 \times 6 + 7 \div 2 - 6 = 20$ (b) $36 \div 6 + 3 \times 5 - 3 = 45$

(c) $36 + 6 - 3 \times 5 \div 3 = 24$ (d) $36 - 6 + 3 \times 5 \div 3 = 74$

(Assistant Grade, 1994)

20. If P denotes +, Q denotes −, R denotes × and S denotes ÷, which of the following statements is correct ?

(a) 36 R 4 S 8 Q 7 P 4 = 10 (b) 16 R 12 P 49 S 7 Q 9 = 200

(c) 32 S 8 R 9 = 160 Q 12 R 12 (d) 8 R 8 P 8 S 8 Q 8 = 57

21. If L denotes ÷, M denotes ×, P denotes + and Q denotes −, then which of the following statements is true ?

(a) 32 P 8 L 16 Q 4 $= -\frac{3}{2}$ (b) 6 M 18 Q 26 L 13 P 7 $= \frac{173}{13}$

(c) 11 M 34 L 17 Q 8 L 3 $= \frac{38}{3}$ (d) 9 P 9 L 9 Q 9 M 9 = − 71

22. If × stands for 'addition', < for 'subtraction', + stands for 'division', > for 'multiplication', − stands for 'equal to', ÷ for 'greater than' and = stands for 'less than', state which of the following is true ? **(U.D.C. 1994)**

(a) $3 \times 2 < 4 \div 16 > 2 + 4$ (b) $5 > 2 + 2 = 10 < 4 \times 8$

(c) $3 \times 4 > 2 - 9 + 3 < 3$ (d) $5 \times 3 < 7 \div 8 + 4 \times 1$

Directions (*Questions 23 to 27*) : *If > denotes +, < denotes −, + denotes ÷, ∧ denotes ×, − denotes =, × denotes > and = denotes <, choose the correct statement in each of the following questions.*

23. (a) $6 + 3 > 8 = 4 + 2 < 1$ (b) $4 > 6 + 2 \times 32 + 4 < 1$

(c) $8 < 4 + 2 = 6 > 3$ (d) $14 + 7 > 3 = 6 + 3 > 2$

24. (a) $14 > 18 + 9 = 16 + 4 < 1$ (b) $4 > 3 \wedge 8 < 1 - 6 + 2 > 24$

(c) $3 < 6 \wedge 4 > 25 = 8 + 4 > 1$ (d) $12 > 9 + 3 < 6 \times 25 + 5 > 6$

25. (a) $13 > 7 < 6 + 2 = 3 \wedge 4$ (b) $9 > 5 > 4 - 18 + 9 > 16$

(c) $9 < 3 < 2 > 1 \times 8 \wedge 2$ (d) $28 + 4 \wedge 2 = 6 \wedge 4 + 2$

26. (a) $29 < 18 + 6 = 36 + 6 \wedge 4$ (b) $18 > 12 + 4 \times 7 > 8 \wedge 2$

(c) $32 > 6 + 2 = 6 < 7 \wedge 2$ (d) $31 > 1 < 2 = 4 > 6 \wedge 7$

27. (a) $7 > 7 < 7 + 7 = 14$ (b) $7 \wedge 7 > 7 + 7 = 7 \wedge 7 > 1$

(c) $7 < 7 + 7 = 6$ (d) $7 + 7 > 7 = 8$

Directions (*Questions 28 to 32*) : *In each of the following questions, different alphabets stand for various symbols as indicated below :*

Addition : O	***Subtraction : M***	***Multiplication : A***
Division : Q	***Equal to : X***	***Greater than : Y***
Less than : Z		**(I. Tax & Central Excise, 1996)**

Out of the four alternatives given in these questions, only one is correct according to the above letter symbols. Identify the correct answer.

28. (a) 2 Z 2 A 4 O 1 A 4 M 8 (b) 8 Y 2 A 3 A 4 Q 2 A 4

(c) 10 X 2 O 2 A 4 O 1 M 2 (d) 12 X 4 O 2 Q 1 A 4 A 2

29. (*a*) 1 O 1 Q 1 M 1 Y 3 Q 1 (*b*) 2 Q 1 O 10 A 1 Z 6 A 4
(*c*) 3 O 2 O 10 Q 2 X 10 A 2 (*d*) 5 Q 5 A 5 O 5 Y 5 A 2

30. (*a*) 3 O 2 X 2 Q 1 A 3 O 1 (*b*) 6 M 2 Y 10 Q 2 A 3 O 1
(*c*) 10 A 2 Z 2 Q 2 A 10 Q 2 (*d*) 10 A 2 Y 2 Q 1 A 10 Q 2

31. (*a*) 32 X 8 Q 2 A 3 Q 1 A 2 (*b*) 14 X 2 A 4 A 2 M 2 Q 1
(*c*) 2 Y 1 A 1 Q 1 O 1 A 1 (*d*) 16 Y 8 A 3 O 1 A 2 M 2

32. (*a*) 8 Q 4 A 1 M 2 X 16 M 16 (*b*) 8 O 2 A 12 Q 10 X 18 Q 9
(*c*) 6 Q 2 O 1 O 1 X 16 A 1 (*d*) 2 O 3 M 4 Q 2 Z 1 A 2

Directions (*Questions 33 to 37*) : *In the following questions, different letters stand for various symbols as indicated below :*

R : Addition ***S : Subtraction*** ***T : Multiplication***
U : Division ***V : Equal to*** ***W : Greater than***
X : Less than

Out of the four alternatives given in these questions, only one is correct according to the above letter symbols. Identify the correct one.

33. (*a*) 16 T 2 R 4 U 6 X 8 (*b*) 16 R 2 S 4 V 6 R 8
(*c*) 16 T 2 U 4 V 6 R 8 (*d*) 16 U 2 R 4 S 6 W 8

34. (*a*) 20 U 4 R 4 X 2 T 3 (*b*) 20 S 4 U 4 V 2 T 3
(*c*) 20 T 4 U 4 U 2 X 3 (*d*) 20 R 4 U 4 S 2 W 3

35. (*a*) 15 U 5 R 3 V 2 T 3 (*b*) 15 U 5 W 3 R 2 T 3
(*c*) 15 S 5 T 3 W 2 R 3 (*d*) 15 R 5 U 3 V 2 R 3

36. (*a*) 24 U 3 R 2 S 2 W 8 (*b*) 24 S 3 X 2 T 2 U 8
(*c*) 24 R 3 S 2 X 2 T 8 (*d*) 24 U 3 T 2 V 2 T 8

37. (*a*) 30 R 6 U 2 W 4 T 3 (*b*) 30 S 6 S 2 X 4 T 3
(*c*) 30 S 6 U 2 U 4 V 3 (*d*) 30 U 6 R 2 W 4 T 3

ANSWERS

1. (*c*) : Using the correct symbols, we have :
Given expression $= 20 + 8 - 8 \div 4 \times 2$
$= 20 + 8 - 2 \times 2 = 20 + 8 - 4 = 24.$

2. (*e*) : Using the correct symbols, we have :
Given expression $= 40 + 12 \div 3 \times 6 - 60$
$= 40 + 4 \times 6 - 60 = 40 + 24 - 60 = 4.$

3. (*b*) : Using the correct symbols, we have :
Given expression $= 8 \div 6 - 4 \times 3 + 4$
$= \frac{4}{3} - 4 \times 3 + 4 = \frac{4}{3} - 12 + 4 = \frac{-20}{3}.$

4. (*c*) : Using the correct symbols, we have :
Given expression $= (3 \times 15 + 19) \div 8 - 6$
$= (45 + 19) \div 8 - 6 = 64 \div 8 - 6 = 8 - 6 = 2.$

5. (*e*) : Using the correct symbols, we have :
Given expression $= 4 \times 11 - 5 + 55 = 44 - 5 + 55 = 94.$

6. (*b*) : Using the correct symbols, we have :
Given expression $= 8 + 7 \times 8 \div 40 - 2$
$= 8 + 7 \times \frac{1}{5} - 2 = 8 + \frac{7}{5} - 2 = \frac{37}{5} = 7\frac{2}{5}.$

7. (c) : Using the correct symbols, we have :
Given expression $= 15 \div 3 + 15 - 5 \times 2 = 5 + 15 - 5 \times 2 = 5 + 15 - 10 = 10.$

8. (e) : Using the correct symbols, we have :
Given expression $= 15 \times 2 + 900 \div 90 - 100$
$= 15 \times 2 + 10 - 100 = 30 + 10 - 100 = -60.$

9. (a) : Using the correct symbols, we have :
Given expression $= 8 \div 6 - 4 \times 7 + 3$
$= \frac{4}{3} - 4 \times 7 + 3 = \frac{4}{3} - 28 + 3 = -\frac{71}{3}.$

10. (a) : Using the correct symbols, we have :
Given expression $= \frac{(36 - 4) \div 8 - 4}{4 \times 8 - 2 \times 16 + 1}$
$= \frac{32 \div 8 - 4}{32 - 32 + 1} = \frac{4 - 4}{1} = 0.$

11. (b) : Using the correct symbols, we have :
Given expression $= 18 \times 12 \div 4 + 5 - 6$
$= 18 \times 3 + 5 - 6 = 54 + 5 - 6 = 53.$

12. (b) : Using the correct symbols, we have :
Given expression $= 18 \times 14 + 6 - 16 \div 4$
$= 18 \times 14 + 6 - 4 = 252 + 6 - 4 = 254.$

13. (e) : Using the correct symbols, we have :
Given expression $= 15 \div 3 + 24 - 12 \times 2$
$= 5 + 24 - 12 \times 2 = 5 + 24 - 24 = 5.$

14. (d) : Using the correct symbols, we have :
Given expression $= (7 \times 3) - 6 + 5 = 21 - 6 + 5 = 20.$

15. (c) : Using the correct symbols, we have :
Given expression $= (10 \times 4) + (4 \times 4) - 6 = 40 + 16 - 6 = 50.$

16. (d) : Using the correct symbols, we have :
Given expression $= 16 + 24 \div 8 - 6 \div 2 \times 3$
$= 16 + 3 - 3 \times 3 = 16 + 3 - 9 = 10.$

17. (a) : Using the proper notations in (a), we get the statement as
$52 - 4 \times 5 + 8 \div 2 = 52 - 4 \times 5 + 4 = 52 - 20 + 4 = 36.$

18. (c) : Using the proper notations in (c), we get the statement as
$16 \times 5 \div 10 + 4 - 3 = 16 \times \frac{1}{2} + 4 - 3 = 8 + 4 - 3 = 9.$

19. (d) : Using the proper notations in (d), we get the statement as
$36 \times 6 \div 3 + 5 - 3 = 36 \times 2 + 5 - 3 = 72 + 5 - 3 = 74.$

20. (d) : Using the proper notations in (d), we get the statement as
$8 \times 8 + 8 \div 8 - 8 = 8 \times 8 + 1 - 8 = 64 + 1 - 8 = 57.$

21. (d) : Using the proper notations in (d), we get the statement as
$9 + 9 \div 9 - 9 \times 9 = 9 + 1 - 9 \times 9 = 9 + 1 - 81 = -71.$

22. (b) : Using the proper notations in (b), we get the statement as
$5 \times 2 \div 2 < 10 - 4 + 8$ or $5 < 14$, which is true.

23. (c) : Using the proper notations in (c), we get the statement as
$8 - 4 \div 2 < 6 + 3$ or $6 < 9$, which is true.

24. (b) : Using the proper notations in (b), we get the statement as
$4 + 3 \times 8 - 1 = 6 \div 2 + 24$ or $27 = 27$, which is true.

25. (*b*) : Using the proper notations in (*b*), we get the statement as $9 + 5 + 4 = 18 \div 9 + 16$ or $18 = 18$, which is true.

26. (*d*) : Using the proper notations in (*d*), we get the statement as $31 + 1 - 2 < 4 + 6 \times 7$ or $30 < 46$, which is true.

27. (*a*) : Using the proper notations in (*a*), we get the statement as $7 + 7 - 7 + 7 < 14$ or $13 < 14$, which is true.

28. (*a*) : Using the proper notations in (*a*), we get the statement as $2 < 2 \times 4 + 1 \times 4 - 8$ or $2 < 4$, which is true.

29. (*b*) : Using the proper notations in (*b*), we get the statement as $2 \div 1 + 10 \times 1 < 6 \times 4$ or $12 < 24$, which is true.

30. (*d*) : Using the proper notations in (*d*), we get the statement as $10 \times 2 > 2 \div 1 \times 10 + 2$ or $20 > 10$, which is true.

31. (*b*) : Using the proper notations in (*b*), we get the statement as $14 = 2 \times 4 \times 2 - 2 \div 1$ or $14 = 14$, which is true.

32. (*a*) : Using the proper notations in (*a*), we get the statement as $8 \div 4 \times 1 - 2 = 16 - 16$ or $0 = 0$, which is true.

33. (*b*) : Using the proper notations in (*b*), we get the statement as $16 + 2 - 4 = 6 + 8$ or $14 = 14$, which is true.

34. (*d*) : Using the proper notations in (*d*), we get the statement as $20 + 4 \div 4 - 2 > 3$ or $19 > 3$, which is true.

35. (*a*) : Using the proper notations in (*a*), we get the statement as $15 \div 5 + 3 = 2 \times 3$ or $6 = 6$, which is true.

36. (*d*) : Using the proper notations in (*d*), we get the statement as $24 \div 3 \times 2 = 2 \times 8$ or $16 = 16$, which is true.

37. (*a*) : Using the proper notations in (*a*), we get the statement as $30 + 6 \div 2 > 4 \times 3$ or $33 > 12$, which is true.

TYPE 2 : INTERCHANGE OF SIGNS AND NUMBERS

Ex. 1. If the given interchanges namely : signs + and ÷ and numbers 2 and 4 are made in signs and numbers, which one of the following four equations would be correct ?

(*a*) $2 + 4 \div 3 = 3$ (*b*) $4 + 2 \div 6 = 1.5$ (*c*) $4 \div 2 + 3 = 4$ (*d*) $2 + 4 \div 6 = 8$

Sol. Interchanging + and ÷ and 2 and 4, we get :

(*a*) $4 \div 2 + 3 = 3$ or $5 = 3$, which is false.

(*b*) $2 \div 4 + 6 = 1.5$ or $6.5 = 1.5$, which is false.

(*c*) $2 + 4 \div 3 = 4$ or $\frac{10}{3} = 4$, which is false.

(*d*) $4 \div 2 + 6 = 8$ or $8 = 8$, which is true.

Ex. 2. Which one of the four interchanges in signs and numbers would make the given equation correct ?

$$3 + 5 - 2 = 4$$

(*a*) + and –, 2 and 3 (*b*) + and –, 2 and 5

(*c*) + and –, 3 and 5 (*d*) None of these

Sol. By making the interchanges given in (*a*), we get the equation as $2 - 5 + 3 = 4$ or $0 = 4$, which is false.

By making the interchanges given in (*b*), we get the equation as $3 - 2 + 5 = 4$ or $6 = 4$, which is false.

By making the interchanges given in (*c*), we get the equation as $5 - 3 + 2 = 4$ or $4 = 4$, which is true.

So, the answer is (*c*).

EXERCISE 12B

Directions (*Questions 1 to 4*) : *In each of the following questions if the given interchanges are made in signs and numbers, which one of the four equations would be correct ?*

1. Given interchanges : Signs − and + and numbers 4 and 8.

(*a*) $6 - 8 + 4 = -1$ (*b*) $8 - 6 + 4 = 1$

(*c*) $4 + 8 - 2 = 6$ (*d*) $4 - 8 + 6 = 2$

2. Given interchanges : Signs + and × and numbers 4 and 5.

(*a*) $5 \times 4 + 20 = 40$ (*b*) $5 \times 4 + 20 = 85$

(*c*) $5 \times 4 + 20 = 104$ (*d*) $5 \times 4 + 20 = 95$

3. Given interchanges : Signs + and − and numbers 4 and 8.

(*a*) $4 + 8 - 12 = 16$ (*b*) $4 - 8 + 12 = 0$

(*c*) $8 + 4 - 12 = 24$ (*d*) $8 - 4 + 12 = 8$

4. Given interchanges : Signs − and × and numbers 3 and 6.

(*a*) $6 - 3 \times 2 = 9$ (*b*) $3 - 6 \times 8 = 10$

(*c*) $6 \times 3 - 4 = 15$ (*d*) $3 \times 6 - 4 = 33$

5. Find out the two signs to be interchanged for making following equation correct :

$5 + 3 \times 8 - 12 + 4 = 3$ **(C.A.T. 1997)**

(*a*) + and − (*b*) − and + (*c*) + and × (*d*) + and +

Directions (*Questions 6 to 10*) : *In each of the following questions, an equation becomes incorrect due to the interchange of two signs. One of the four alternatives under it specifies the interchange of signs in the equation, which when made will make the equation correct. Find the correct alternative.* **(U.D.C. 1991)**

6. $5 + 6 + 3 - 12 \times 2 = 17$

(*a*) + and × (*b*) + and × (*c*) + and + (*d*) + and −

7. $2 \times 3 + 6 - 12 + 4 = 17$

(*a*) × and + (*b*) + and − (*c*) + and + (*d*) − and +

8. $16 - 8 + 4 + 5 \times 2 = 8$

(*a*) + and × (*b*) − and + (*c*) + and + (*d*) − and ×

9. $9 + 5 + 4 \times 3 - 6 = 12$

(*a*) + and × (*b*) + and × (*c*) + and − (*d*) + and −

10. $12 + 2 - 6 \times 3 + 8 = 16$

(*a*) + and + (*b*) − and + (*c*) × and + (*d*) + and ×

11. Which of the following two signs need to be interchanged to make the given equation correct ? **(M.B.A. 1997)**

$10 + 10 + 10 - 10 \times 10 = 10$

(*a*) + and − (*b*) + and + (*c*) + and × (*d*) + and +

Directions (*Questions 12 to 16*) : *In each of the following questions, the two expressions on either side of the sign* (=) *will have the same value if two terms on either side or on the same side are interchanged. The correct terms to be interchanged have been given as one of the four alternatives under the expressions. Find the correct alternative in each case.* **(C.A.T. 1997)**

12. $5 + 3 \times 6 - 4 \div 2 = 4 \times 3 - 10 \div 2 + 7$

(*a*) 4, 7 (*b*) 5, 7 (*c*) 6, 4 (*d*) 6, 10

13. $7 \times 2 - 3 + 8 \div 4 = 5 + 6 \times 2 - 24 \div 3$

(*a*) 2, 6 (*b*) 6, 5 (*c*) 3, 24 (*d*) 7, 6

14. $15 + 3 \times 4 - 8 \div 2 = 8 \times 5 + 16 \div 2 - 1$

(*a*) 3, 5 (*b*) 15, 5 (*c*) 15, 16 (*d*) 3, 1

15. $6 \times 3 + 8 \div 2 - 1 = 9 - 8 \div 4 + 5 \times 2$

(*a*) 3, 4 (*b*) 3, 5 (*c*) 6, 9 (*d*) 9, 5

16. $8 \div 2 \times 5 - 11 + 9 = 6 \times 2 - 5 + 4 \div 2$

(*a*) 5, 9 (*b*) 8, 5 (*c*) 9, 6 (*d*) 11, 5

Directions (*Questions 17 to 20*) : *In each of the following questions, which one of the four interchanges in signs and numbers would make the given equation correct ?*

17. $6 \times 4 + 2 = 16$

(*a*) + and ×, 2 and 4 (*b*) + and ×, 2 and 6

(*c*) + and ×, 4 and 6 (*d*) None of these

18. $(3 \div 4) + 2 = 2$

(*a*) + and ÷, 2 and 3 (*b*) + and ÷, 2 and 4

(*c*) + and ÷, 3 and 4 (*d*) No interchange, 3 and 4

19. $4 \times 6 - 2 = 14$

(*a*) × to +, 2 and 4 (*b*) − to +, 2 and 6

(*c*) − to +, 2 and 6 (*d*) × to +, 4 and 6

20. $(6 \div 2) \times 3 = 0$

(*a*) + and ×, 2 and 3 (*b*) × to −, 2 and 6

(*c*) ÷ and ×, 2 and 6 (*d*) × to −, 2 and 3

ANSWERS

1. (*c*) : On interchanging − and ÷ and 4 and 8 in (*c*), we get the equation as $8 - 4 \div 2 = 6$ or $8 - 2 = 6$ or $6 = 6$, which is true.

2. (*c*) : On interchanging + and × and 4 and 5 in (*c*), we get the equation as $4 + 5 \times 20 = 104$ or $104 = 104$, which is true.

3. (*b*) : On interchanging + and − and 4 and 8 in (*b*), we get the equation as $8 + 4 - 12 = 0$ or $12 - 12 = 0$ or $0 = 0$, which is true.

4. (*b*) : On interchanging − and × and 3 and 6 in (*b*), we get the equation as $6 \times 3 - 8 = 10$ or $18 - 8 = 10$ or $10 = 10$, which is true.

5. (*b*) : On interchanging − and ÷, we get the equation as

$5 + 3 \times 8 \div 12 - 4 = 3$ or $5 + 3 \times \frac{2}{3} - 4 = 3$ or $3 = 3$, which is true.

6. (*a*) : On interchanging ÷ and ×, we get :

Given expression $= 5 + 6 \times 3 - 12 \div 2 = 5 + 6 \times 3 - 6 = 5 + 18 - 6 = 17$.

7. (*a*) : On interchanging × and +, we get :
Given expression $= 2 + 3 \times 6 - 12 \div 4 = 2 + 3 \times 6 - 3 = 2 + 18 - 3 = 17$.

8. (*b*) : On interchanging − and ÷, we get :
Given expression $= 16 \div 8 - 4 + 5 \times 2 = 2 - 4 + 5 \times 2 = 2 - 4 + 10 = 8$.

9. (*c*) : On interchanging ÷ and −, we get :
Given expression $= 9 + 5 - 4 \times 3 \div 6 = 9 + 5 - 4 \times \frac{1}{2} = 9 + 5 - 2 = 12$.

10. (*b*) : On interchanging − and +, we get :
Given expression $= 12 \div 2 + 6 \times 3 - 8 = 6 + 6 \times 3 - 8 = 6 + 18 - 8 = 16$.

11. (*c*) : On interchanging + and ×, we get the equation as
$10 \times 10 \div 10 - 10 + 10 = 10$ or $10 \times 1 - 10 + 10 = 10$ or $10 = 10$, which is true.

12. (*c*) : On interchanging 6 and 4 on L.H.S., we get the statement as
$5 + 3 \times 4 - 6 \div 2 = 4 \times 3 - 10 \div 2 + 7$ or $5 + 12 - 3 = 12 - 5 + 7$ or $14 = 14$, which is true.

13. (*d*) : On interchanging 7 and 6, we get the statement as
$6 \times 2 - 3 + 8 \div 4 = 5 + 7 \times 2 - 24 \div 3$ or $12 - 3 + 2 = 5 + 14 - 8$ or $11 = 11$, which is true.

14. (*a*) : On interchanging 3 and 5, we get the statement as
$15 + 5 \times 4 - 8 \div 2 = 8 \times 3 + 16 \div 2 - 1$ or $15 + 20 - 4 = 24 + 8 - 1$ or $31 = 31$, which is true.

15. (*d*) : On interchanging 9 and 5 on R.H.S., we get the statement as
$6 \times 3 + 8 \div 2 - 1 = 5 - 8 \div 4 + 9 \times 2$ or $18 + 4 - 1 = 5 - 2 + 18$ or $21 = 21$, which is true.

16. (*c*) : On interchanging 9 and 6, we get the statement as
$8 + 2 \times 5 - 11 \div 6 = 9 \times 2 - 5 + 4 \div 2$ or $4 \times 5 - 11 + 6 = 18 - 5 + 2$ or $15 = 15$, which is true.

17. (*c*) : On interchanging + and × and 4 and 6, we get the equation as
$4 + 6 \times 2 = 16$ or $4 + 12 = 16$ or $16 = 16$, which is true.

18. (*a*) : On interchanging + and ÷ and 2 and 3, we get the equation as
$(2 + 4) \div 3 = 2$ or $6 \div 3 = 2$ or $2 = 2$, which is true.

19. (*c*) : On changing − to + and interchanging 2 and 6, we get the equation as
$4 \times 2 + 6 = 14$ or $8 + 6 = 14$ or $14 = 14$, which is true.

20. (*d*) : On changing × to − and interchanging 2 and 3, we get the equation as
$(6 \div 3) - 2 = 0$ or $2 - 2 = 0$ or $0 = 0$, which is true.

TYPE 3 : DERIVING THE APPROPRIATE CONCLUSIONS

Ex. 1. It being given that × denotes 'greater than', ϕ denotes 'equal to', < denotes 'not less than', $\perp$ denotes 'not equal to', Δ denotes 'less than' and + denotes 'not greater than', **(M.B.A. 1998)**
choose the correct statement from the following :
If $a \times b \,\Delta\, c$, it follows that
(*a*) $a \,\phi\, c \,\Delta\, b$ (*b*) $b < a \times c$ (*c*) $a < b + c$
(*d*) $c + b < a$ (*e*) $b < a \,\phi\, c$

Sol. Using the usual notations, we have :
(*a*) : The statement is $a > b < c \Rightarrow a = c < b$, which is false. [$\because c > b$]
(*b*) : The statement is $a > b < c \Rightarrow b \not< a > c$, which is false. [$\because b < a$]
(*c*) : The statement is $a > b < c \Rightarrow a \not< b \not> c$, which is true.
(*d*) : The statement is $a > b < c \Rightarrow c \not> b \not< a$, which is false. [$\because b < a$]
(*e*) : The statement is $a > b < c \Rightarrow b \not< a = c$, which is false. [$\because b < a$]
Hence, the statement (*c*) is true.

Ex. 2. In the following questions, the symbols $*$, $\underline{*}$, $=$, @ and $\underline{@}$ are used with the following meanings : **(S.B.I.P.O. 1997)**

'A * B' means 'A is greater than B';
'A $\underline{*}$ B' means 'A is either greater than or equal to B';
'A = B' means 'A is equal to B';
'A @ B' means 'A is smaller than B';
'A $\underline{@}$ B' means 'A is either smaller than or equal to B'.

Now, in each of the following questions, assuming the given statements to be true, find which of the two conclusions I and II given below them is/are definitely true ?

Give answer (*a*) if only conclusion I is true; (*b*) if only conclusion II is true; (*c*) if either I or II is true; (*d*) if neither I nor II is true and (*e*) if both I and II are true.

1. **Statements :** M = T, T $\underline{@}$ Z, S * M
   Conclusions : I. Z * M II. Z = M
2. **Statements :** R $\underline{@}$ M, M * P, R $\underline{*}$ L
   Conclusions : I. M = L II. P = L
3. **Statements :** L @ C, C * Z, Z $\underline{@}$ F
   Conclusions : I. C * F II. F = C
4. **Statements :** Z @ B, N $\underline{*}$ S, B @ N
   Conclusions : I. B = Z II. S $\underline{@}$ B
5. **Statements :** T $\underline{*}$ P, P @ S, P = M
   Conclusions : I. S * M II. T @ S

Sol. 1. Given statements : M = T, T $\leq$ Z, S > M
Now, to verify conclusions I and II, we need to find a relation between Z and M.
Z $\geq$ T, T = M $\Rightarrow$ Z $\geq$ M
$\Rightarrow$ Z > M or Z = M *i.e.*, Z * M or Z = M.
So, either I or II follows.
Hence, the answer is (*c*).

2. Given statements : R $\leq$ M, M > P, R $\geq$ L
I. Relation between M and L :
M $\geq$ R, R $\geq$ L $\Rightarrow$ M $\geq$ L *i.e.*, M $\underline{*}$ L.
So, I is not true.
II. Relation between P and L.
P < M, M $\geq$ R, R $\geq$ L $\Rightarrow$ no definite conclusion.
So, II is also not true.
Hence, the answer is (*d*).

3. Given statements : L < C, C > Z, Z $\leq$ F.
Clearly, we find a relation between C and F.
C > Z, Z $\leq$ F $\Rightarrow$ no definite conclusion.
So, neither I nor II is true.
Hence, the answer is (*d*).

4. Given statements : Z < B, N $\geq$ S, B < N.
I. Relation between B and Z :
Clearly, B > Z *i.e.*, B * Z.
So, I is not true.

II. Relation between S and B :
$S \leq N,\ N > B \Rightarrow$ no definite conclusion.
So, II is also not true.
Hence, the answer is (*d*).

5. Given statements : $T \geq P,\ P < S,\ P = M$
I. Relation between S and M :
$S > P,\ P = M \Rightarrow S > M$ *i.e.*, $S \neq M$.
So, I is true.
II. Relation between T and S :
$T \geq P,\ P < S \Rightarrow$ no definite conclusion.
So, II is not true.
Hence, the answer is (*a*).

EXERCISE 12C

1. Which of the following conclusions is correct according to the given expressions and symbols ? **(U.D.C. 1995)**
A : $\nless$ B : > C : $\neq$ D : = E : $\nleq$ F : <
Expressions : (aEb) and (bEc)
(*a*) aEc (*b*) aFc (*c*) cBa (*d*) cBb

2. Find the correct inference according to given premises and symbols :
A : Not greater than B : Greater than C : Not equal to
D : Equal to E : Not less than F : Less than
Premises : (*l*C*m*) and (*l*Am)
(*a*) *l*B*m* (*b*) *l*D*m* (*c*) *l*E*m* (*d*) *l*F*m*
(Transmission Executives', 1994)

Directions (*Questions 3 to 8*) : *It being given that :*
Δ denotes 'equal to'; □ denotes 'not equal to'; + denotes 'greater than'; − denotes 'less than'; × denotes 'not greater than'; ÷ denotes 'not less than'. Choose the correct statement in each of the following questions :

3. $a - b - c$ implies
(*a*) $a - b + c$ (*b*) $b + a - c$ (*c*) $c \times b + a$ (*d*) $b + a \div c$

4. $a + b - c$ implies
(*a*) $b - c - a$ (*b*) $c - b + a$ (*c*) $c + b - a$ (*d*) $c \times b + a$

5. $a \times b \div c$ implies
(*a*) $a - b + c$ (*b*) $c \times b \div a$ (*c*) a □ b □ c (*d*) $b \div a \div c$

6. $a + b + c$ does not imply
(*a*) $b - a + c$ (*b*) $c - b - a$ (*c*) $c - a + b$ (*d*) $b - a - c$

7. $a + b - c$ does not imply
(*a*) $c + b - a$ (*b*) $b - a + c$ (*c*) b □ a □ c (*d*) None of these

8. a □ b □ c implies
(*a*) $a + b + c$ (*b*) $a - b - c$ (*c*) $a \div b \div c$ (*d*) None of these

Directions (*Questions 9-10*) : *If α means 'greater than', β means 'equal to', θ means 'not less than', γ means 'less than', δ means 'not equal to' and*

η means 'not greater than', then which of the four alternatives could be a correct or proper inference in each of the following ? **(P.C.S. 1995)**

9. $a \alpha 2b$ and $2b \theta r$

(a) $a \eta r$ (b) $a \alpha r$ (c) $a \beta r$ (d) $a \gamma r$

10. $2x \delta y$ and $y \beta 3z$

(a) $y \delta 6x$ (b) $2x \eta 3z$ (c) $2x \delta 3z$ (d) $3z \eta 3y$

11. If A stands for 'not equal to' (≠), B stands for 'greater than' (>), C stands for 'not less than' (≮), D stands for 'equal to' (=), E stands for 'not greater than' (≯), F stands for 'less than' (<), then according to the given premises (4x F 5y) and (5y E 3s), which of the following inferences is correct ? **(C.B.I. 1994)**

(a) 4x A 3s (b) 4x B 3s (c) 4x C 3s (d) 4x D 3s

Directions (*Questions 12 to 17*) : *In the following questions,*

Δ means 'is greater than', % means 'is lesser than', □ means 'is equal to' = means 'is not equal to', + means 'is a little more than', × means 'is a little less than'.

Choose the correct alternative in each of the following questions.

12. If $a \Delta b$ and $b + c$, then

(a) $a \% c$ (b) $c \% a$ (c) $c + a$ (d) Can't say

13. If $c = a$ and $a = b$, then

(a) $b \Delta a$ (b) $c \square a$ (c) $b = a$ (d) Can't say

14. If $a \times b$ and $b \square c$, then

(a) $c + a$ (b) $b \Delta c$ (c) $a + c$ (d) $c \square a$

15. If $c \% b$ and $b \times a$, then

(a) $a \Delta c$ (b) $c \square a$ (c) $b \square c$ (d) $c \Delta a$

16. If $ac + bc$, then

(a) $a \square c$ (b) $b \Delta c$ (c) $c \Delta b$ (d) $b \% a$

17. If $ac \% bd$ and $ab \Delta cd$, then

(a) $b \square c$ (b) $b \Delta a$ (c) $a \% c$ (d) Can't say

Directions (*Questions 18 to 22*) : *In each of the following questions, the Greek letters standing for arithmetical operations are given. Find the relationship which can definitely be deduced from the two relationships given at the top.*

Operations : α is 'greater than', β is 'less than', γ is 'not greater than', δ is 'not less than', θ is 'equal to'.

18. If A α 2C and 2A θ 3B, then

(a) C β B (b) C δ B (c) C α B (d) C θ B

19. If 3A α B and 3B α 2C, then

(a) 4A α C (b) 5A α C (c) 2A θ C (d) 3A δ C

20. If B θ 2C and 3C γ A, then

(a) B δ 2A (b) B θ A (c) 3B α 2A (d) B β A

21. If 3C δ 2A and B α C, then

(a) 2A α 3B (b) 3B α 2A (c) B θ A (d) 3B θ 2A

22. If 3B θ 2C and 2A α 3C, then

(a) B δ A (b) B θ A (c) B β A (d) B α A

Directions (*Questions 23 to 27*) : *In the following questions the symbols* $\oplus$, $\underline{\oplus}$, @, $\underline{@}$ *and* = *are used with the following meaning :*

$\oplus$ means 'greater than'; $\underline{\oplus}$ means 'either greater than or equal to'; @ means 'smaller than'; $\underline{@}$ means 'either smaller than or equal to'; = means 'equal to'.

Now in each of the following questions, assuming the given statements to be true, find which of the two conclusions I and II given below them is/are definitely true ?

Give answer (a) if only conclusion I is true; (b) if only conclusion II is true; (c) if either I or II is true, (d) if neither I nor II is true and (e) if both I and II are true.

23. Statements : $M \underline{@} N,\ L \oplus N,\ M = P$
Conclusions : I. $N = P$ II. $N @ P$

24. Statements : $A \underline{@} C,\ M \underline{@} F,\ C \oplus F$
Conclusions : I. $M = A$ II. $C \oplus M$

25. Statements : $B \underline{@} P,\ C \oplus N,\ P = N$
Conclusions : I. $P @ C$ II. $C \oplus B$

26. Statements : $K @ P,\ Z \oplus K,\ K \underline{\oplus} M$
Conclusions : I. $Z = M$ II. $Z \oplus M$

27. Statements : $Z @ P,\ T = M,\ M \underline{\oplus} Z$
Conclusions : I. $M \oplus Z$ II. $T \underline{\oplus} P$

Directions (*Questions 28 to 32*) : *In the following questions, the symbols,* ©, $\underline{©}$, =, * *and* $\underline{*}$ *are used with the following meanings :* **(Bank P.O. 1997)**

'P © Q' means 'P is greater than Q';
'P $\underline{©}$ Q' means 'P is greater than or equal to Q';
'P = Q' means 'P is equal to Q';
'P * Q' means 'P is smaller than Q';
'P $\underline{*}$ Q' means 'P is either smaller than or equal to Q'.

Now in each of the following questions, assuming the given statements to be true, find which of the two conclusions I and II given below them is/are definitely true.

Give answer (a) if only conclusion I is true; (b) if only conclusion II is true; (c) if either I or II is true; (d) if neither I nor II is true and (e) if both I and II are true.

28. Statements : $P © T,\ M \underline{*} K,\ T = K$
Conclusions : I. $T © M$ II. $T = M$

29. Statements : $S * M,\ M © L,\ L \underline{©} Z$
Conclusions : I. $S = Z$ II. $S \underline{*} L$

30. Statements : $D © F,\ F = S,\ S \underline{*} M$
Conclusions : I. $D © M$ II. $F \underline{©} M$

31. Statements : $J = V,\ V * N,\ R \underline{*} J$
Conclusions : I. $R * N$ II. $J \underline{©} N$

32. Statements : $L \underline{©} U,\ C * L,\ C © B$
Conclusions : I. $U = C$ II. $L © B$

Directions (*Questions 33 to 35*) : *In the following questions :*

'P * Q' means 'P is greater than Q';

'P ⩾ Q' means 'P is either greater than or equal to Q';

'P = Q' means 'P is equal to Q';

'P □ Q' means 'P is smaller than Q';

'P ⊑ Q' means 'P is either smaller than or equal to Q'.

In each question, a statement is given followed by two conclusions I and II. You are to consider each statement and the conclusions that follow and decide which of the conclusions is/are implicit ? **(Assistant Grade, 1998)**

33. Statements : G ⊑ S, F ⩾ S, T □ G.

Conclusions : I. F * T II. T = S.

(*a*) Both I and II are implicit (*b*) Only I is implicit

(*c*) Neither I nor II is implicit (*d*) Only II is implicit

34. Statements : M = N, N * B, B □ P

Conclusions : I. P = N II. B □ M

(*a*) Only I is implicit (*b*) Only II is implicit

(*c*) Both I and II are implicit (*d*) Neither I nor II is implicit

35. Statements : N ⊑ T , T = P

Conclusions : I. P * N II. P = N

(*a*) Either I or II is implicit (*b*) Only I is implicit

(*c*) Only II is implicit (*d*) Neither I nor II is implicit

Directions (*Questions 36 to 39*) : *Assume the following :*

'A @ B' means 'A is greater than B';

'A ● B' means 'A is either greater than or equal to B';

'A $ B' means 'A is equal to B';

'A * B' means 'A is smaller than B';

'A # B' means 'A is either smaller than or equal to B'.

In each question, two statements followed by two conclusions I and II are given. Assuming the statements to be true, state which of the conclusions I and II is/are definitely true ? **(M.B.A. 1998)**

Give answer (a) if only conclusion I is true; (b) if only conclusion II is true; (c) if either I or II is true; (d) if neither I nor II is true; and (e) if both I and II are true.

36. Statements : P # Q, M * N $ P

Conclusions : I. M @ P II. N # Q

37. Statements : L * M, R * T $ L

Conclusions : I. T * M II. R @ L

38. Statements : X @ Y @ Z, U @ Z $ V

Conclusions : I. V * U II. X @ V

39. Statements : G * H # K, H @ Q $ R

Conclusions : I. G $ Q II. R * G

Directions (*Questions 40 to 44*) : *In the following questions,* α *stands for 'equal to';* β *for 'greater than';* γ *for 'less than' and* δ *for 'not equal to'.*

(Hotel Management, 1996)

40. If $6x \alpha 5y$ and $2y \beta 3z$, then
(a) $2x \beta 3z$ (b) $4x \beta 3z$ (c) $2x \gamma z$ (d) $4x \alpha 3z$

41. If $ax \gamma by$, $bx \alpha cz$ and $b^2 \alpha ac$, then
(a) $ax \beta cy$ (b) $ay \alpha cz$ (c) $y \gamma z$ (d) $y \beta z$

42. If $abxy \alpha c^2z$, $bx \beta ay$ and $b^2 \alpha ac$, then
(a) $ax^2 \beta cz$ (b) $a^2x^2 \beta cz$ (c) $b^2x \beta c^2z$ (d) $bx^2 \beta c^2z$

43. If $bcy \gamma ax$, $cy \alpha bz$ and $a^2 \gamma bc$, then
(a) $cx \alpha abz$ (b) $cx \gamma abz$ (c) $cx \delta abz$ (d) $c^2x \gamma a^2z$

44. If $a^2x \alpha byz$, $czx \alpha b^2y$ and $c^2z \alpha axy$, then
(a) $abc \alpha xyz$ (b) $abc \beta xyz$ (c) $abc \delta xyz$ (d) $abc \gamma xyz$

45. If $A + B > C + D$, $B + E = 2C$ and $C + D > B + E$, it necessarily follows that :
(a) $A + B > 2C$ (b) $A + B > 2D$ (c) $A + B > 2E$ (d) $A > C$

(Hotel Management, 1995)

46. If $A + D > C + E$, $C + D = 2B$ and $B + E > C + D$, it necessarily follows that
(a) $A + B > 2D$ (b) $B + D > C + E$ (c) $A + D > B + E$ (d) $A + D > B + C$

(Hotel Management, 1995)

Directions (*Questions 47 to 51*) : *In each of the questions given below, use the following notations :* **(S.B.I.P.O. 1997)**

A"B means 'add B to A'; ***A'B means 'subtract B from A';***
A @ B means 'divide A by B'; ***A * B means 'multiply A by B'.***

Now, answer the following questions.

47. The time taken by two running trains in crossing each other is calculated by dividing the sum of the lengths of two trains by the total speed of the two trains. If the length of the first train is L_1, the length of the second train is L_2; the speed of the first train is V_1 and the speed of the second train is V_2, which of the following expressions would represent the time taken ?
(a) $(L_1" L_2) * (V_1" V_2)$ (b) $(L_1" L_2) @ (V_1" V_2)$
(c) $[(L_1" L_2) @ (V_1" V_2)] * 60$ (d) $(L_1' L_2) @ (V_1' V_2)$
(e) None of these

48. The total airfare is calculated by adding 15% of basic fare as fuel surcharge, 2% of the basic fare as IATA charges and Rs 200 as airport tax to the basic fare. If the basic fare of a sector is B, which of the following will represent the total fare ?
(a) B" (B * 15) @ 100" (B * 2) @ 200" 100
(b) B" (B * 15) @ 100" (B * 2) @ 100" 200
(c) B" (B * 15) @ 100' (B * 2) @ 100" 200
(d) B' (B * 15) @ 100" (B * 2) @ 100" 200
(e) None of these

49. The profit percentage of a commodity is worked out by multiplying the quotient of the difference between the amount of sale price and the total expenses and divided by the amount of total expenses by 100. If the sale price of an article is S, the total expenses are equal to the sum of the cost price (C), transportation

costs (T), labour charges (L), which of the following expressions would indicate the profit percentage ?

(*a*) [{S – (C + L + T)} ÷ (C + L + T) × 100] (*b*) [{S′ (C″L″ T)} @ (C″L″ T) @ 100]

(*c*) [{S′ (C″L″ T)} @ (C″L″ T) • 100] (*d*) [{S″ (C′L′ T)} • (C″L″ T) @ 100]

(*e*) None of these

50. While considering employees for promotion, an organisation gives 2 marks for every year of service beyond the first two years, four-thirds of the marks obtained in an examination out of 90 marks, five marks for each level of education-matriculation, graduation and post-graduation. Which of the following represents the total marks a candidate gets if he has put in T years of service, obtained K marks in the examination and passed Xth, XIIth and Graduation level examinations ?

(*a*) (T′2) • 3″ 5 • 2 ″ 4 • T @ 3 (*b*) (K′2) • 2″ 5 • 3 ″ 4 • T @ 3

(*c*) (T″2) • 2″ 5 • 3 ″ 4 • K @ 3 (*d*) (T′2) • 2″ 5 • 3 ″ 4 • K @ 3

(*e*) None of these

51. In a semester system of examination, the total marks obtained is arrived at by adding 10% of the marks obtained in first periodical, 15% of the marks obtained in the second periodical and 75% of the marks obtained in the final examination. If a student secures P marks out of 150 in first periodical, T marks out of 180 in second periodical and M marks out of 400 in the final examination, which of the following will represent the total marks obtained by him ?

(*a*) (P @ 150 • 10)″ (T @ 400 • 15)″ (M @ 180 • 75)

(*b*) (P @ 150 • 10)′ (T @ 180 • 15)″ (M @ 400 • 75)

(*c*) (P • 150 • 10)″ (T • 180 @ 15)″ (M • 400 @ 75)

(*d*) (P @ 10 • 10)″ (T @ 180 • 15)″ (M @ 400 • 75)

(*e*) None of these

ANSWERS

1. (*a*) : aEb and $bEc \Rightarrow a \leq b$ and $b \leq c \Rightarrow a \leq c \Rightarrow aEc$.

2. (*d*) : lCm and $lAm \Rightarrow l \leq m$ and $l \geqslant m \Rightarrow l < m \Rightarrow lFm$.

3. (*b*) : With usual notations, we have :

(*a*) $a < b < c \Rightarrow a < b > c$, which is false.

(*b*) $a < b < c \Rightarrow b > a < c$, which is true.

(*c*) $a < b < c \Rightarrow c \geqslant b > a$, which is false.

(*d*) $a < b < c \Rightarrow b > a \leq c$, which is false.

4. (*c*) : With usual notations, we have :

(*a*) $a > b < c \Rightarrow b < c < a$, which is false.

(*b*) $a > b < c \Rightarrow c < b > a$, which is false.

(*c*) $a > b < c \Rightarrow c > b < a$, which is true.

(*d*) $a > b < c \Rightarrow c \geqslant b \leq a$, which is false.

5. (*b*) : With usual notations, we have :

(*a*) $a \geqslant b \leq c \Rightarrow a < b > c$, which is not true.

(*b*) $a \geqslant b \leq c \Rightarrow c \geqslant b \leq a$, which is true.

(*c*) $a \geqslant b \leq c \Rightarrow a \neq b \neq c$, which is not true.

(*d*) $a \geqslant b \leq c \Rightarrow b \leq a \leq c$, which is not true.

6. (*d*) : With usual notations, we have :

(*a*) $a > b > c \Rightarrow b < a > c$, which is false.

(*b*) $a > b > c \Rightarrow c < b < a$, which is false.
(*c*) $a > b > c \Rightarrow c < a > b$, which is false.
(*d*) $a > b > c \Rightarrow b < a < c$, which is true.

7. (*b*) : With usual notations, we have :
(*a*) $a > b < c \Rightarrow c > b < a$, which is false.
(*b*) $a > b < c \Rightarrow b < a > c$, which is true.
(*c*) $a > b < c \Rightarrow b \neq a \neq c$, which is false.

8. (*d*) : With usual notations, we have :
(*a*) $a \neq b \neq c \Rightarrow a > b > c$, which is false.
(*b*) $a \neq b \neq c \Rightarrow a < b < c$, which is false.
(*c*) $a \neq b \neq c \Rightarrow a \not< b \not< c$, which is false.

9. (*b*) : $(a\ \alpha\ 2b)$ and $(2b\ \theta\ r) \Rightarrow a > 2b$ and $2b \not< r$
$\Rightarrow a > 2b$ and $2b \geq r \Rightarrow a > r$ *i.e.* $a\ \alpha\ r$.

10. (*c*) : $(2x\ \delta\ y)$ and $(y\ \beta\ 3z) \Rightarrow 2x \neq y$ and $y = 3z$
$\Rightarrow 2x \neq 3z$ *i.e.*, $2x\ \delta\ 3z$.

11. (*a*) : $(4x\ \mathrm{F}\ 5y)$ and $(5y\ \mathrm{E}\ 3s) \Rightarrow (4x < 5y)$ and $(5y \not> 3s)$
$\Rightarrow (4x < 5y)$ and $(5y \leq 3s)$
$\Rightarrow 4x < 3s$ or $4x \neq 3s$
$\Rightarrow 4x\ \mathrm{F}\ 3s$ or $4x\ \mathrm{A}\ 3s$.

12. (*b*) : $a\ \Delta\ b$ and $b + c \Rightarrow a > b$ and b is a little more than c.
$\Rightarrow a > c \Rightarrow c < a$ *i.e.* $c\ \%\ a$.

13. (*c*) : $c = a$ and $a = b \Rightarrow c \neq a$ and $a \neq b \Rightarrow b \neq a$ *i.e.* $b = a$.

14. (*a*) : $a \times b$ and $b\ \square\ c \Rightarrow a$ is a little less than b and $b = c$
$\Rightarrow a$ is a little less than c
$\Rightarrow c$ is a little more than a *i.e.* $c + a$

15. (*a*) : $c\ \%\ b$ and $b \times a \Rightarrow c < b$ and b is a little less than a.
$\Rightarrow c < a \Rightarrow a > c$ *i.e.* $a\ \Delta\ c$.

16. (*d*) : $ac + bc \Rightarrow ac > bc \Rightarrow a > b \Rightarrow b < a$ *i.e.* $b\ \%\ a$.

17. (*d*) : $ac\ \%\ bd$ and $ab\ \Delta\ cd \Rightarrow ac < bd$ and $ab > cd$.
Clearly, no conclusion can be drawn.

18. (*a*) : $\mathrm{A}\ \alpha\ 2\mathrm{C}$ and $2\mathrm{A}\ \theta\ 3\mathrm{B} \Rightarrow \mathrm{A} > 2\mathrm{C}$ and $2\mathrm{A} = 3\mathrm{B}$
$\Rightarrow 2\mathrm{A} > 4\mathrm{C}$ and $2\mathrm{A} = 3\mathrm{B}$
$\Rightarrow 3\mathrm{B} > 4\mathrm{C} \Rightarrow \mathrm{C} < \mathrm{B}$ *i.e.* $\mathrm{C}\ \beta\ \mathrm{B}$.

19. (*b*) : $3\mathrm{A}\ \alpha\ \mathrm{B}$ and $3\mathrm{B}\ \alpha\ 2\mathrm{C} \Rightarrow 3\mathrm{A} > \mathrm{B}$ and $3\mathrm{B} > 2\mathrm{C}$
$\Rightarrow 3\mathrm{A} > \mathrm{B}$ and $\frac{3}{2}\mathrm{B} > \mathrm{C}$
$\Rightarrow \frac{9}{2}\mathrm{A} > \frac{3}{2}\mathrm{B}$ and $\frac{3}{2}\mathrm{B} > \mathrm{C}$
$\Rightarrow \frac{9}{2}\mathrm{A} > \mathrm{C} \Rightarrow 5\mathrm{A} > \mathrm{C}$ *i.e.* $5\mathrm{A}\ \alpha\ \mathrm{C}$.

20. (*d*) : $\mathrm{B}\ \theta\ 2\mathrm{C}$ and $3\mathrm{C}\ \gamma\ \mathrm{A} \Rightarrow \mathrm{B} = 2\mathrm{C}$ and $3\mathrm{C} \not> \mathrm{A}$
$\Rightarrow \mathrm{B} = 2\mathrm{C}$ and $3\mathrm{C} \leq \mathrm{A}$
$\Rightarrow \mathrm{B} = 2\mathrm{C} < 3\mathrm{C} \leq \mathrm{A}$
$\Rightarrow \mathrm{B} < \mathrm{A}$ *i.e.* $\mathrm{B}\ \beta\ \mathrm{A}$.

21. (*b*) : $3\mathrm{C}\ \delta\ 2\mathrm{A}$ and $\mathrm{B}\ \alpha\ \mathrm{C} \Rightarrow 3\mathrm{C} \not< 2\mathrm{A}$ and $\mathrm{B} > \mathrm{C}$
$\Rightarrow 3\mathrm{C} \geq 2\mathrm{A}$ and $\mathrm{B} > \mathrm{C}$
$\Rightarrow 3\mathrm{B} > 3\mathrm{C}$ and $3\mathrm{C} \geq 2\mathrm{A}$
$\Rightarrow 3\mathrm{B} > 2\mathrm{A}$ *i.e.* $3\mathrm{B}\ \alpha\ 2\mathrm{A}$.

22. (*c*) : $3B \theta 2C$ and $2A \alpha 3C \Rightarrow 3B = 2C$ and $2A > 3C$.

$\Rightarrow \frac{9}{2}B = 3C$ and $3C < 2A$

$\Rightarrow \frac{9}{2}B < 2A \Rightarrow B < \frac{4}{9}A$

$\Rightarrow B < A$ *i.e.*, $B \beta A$.

23. (*d*) : Given statements : $M \leq N$, $L > N$, $M = P$.

To verify the given conclusions, we find a relation between N and P.

Now, $N \geq M$, $M = P \geq N \geq P$.

Clearly, both I and II are false.

24. (*b*) : Given statements : $A \leq C$, $M \leq F$, $C > F$

I. Relation between M and A :

$M \leq F$, $F < C$, $C \geq A \Rightarrow$ no definite conclusion.

So, I is not true.

II. Relation between C and M :

$C > F$, $F \geq M \Rightarrow C > M$ *i.e.* $C \oplus M$.

So, II is true.

25. (*e*) : Given statements : $B \leq P$, $C > N$, $P = N$

I. Relation between P and C :

$P = N$, $N < C \Rightarrow P < C$ *i.e.* $P < C$.

So, I is true.

II. Relation between C and B :

$C > N$, $N = P$, $P \geq B \Rightarrow C > B$ *i.e.* $C \oplus B$.

So, II is true.

26. (*b*) : Given statements : $K < P$, $Z > K$, $K \geq M$

Relation between Z and M :

$Z > K$, $K \geq M \Rightarrow Z > M$ *i.e.* $Z \oplus M$.

So, I is false and II is true.

27. (*e*) : Given statements : $Z < P$, $T = M$, $M \geq P$

I. Relation between M and Z :

$M \geq P$, $P > Z \Rightarrow M > Z$ *i.e.* $M \oplus Z$.

So, I is true.

II. Relation between T and P.

$T = M$, $M \geq P \Rightarrow T \geq P$ *i.e.* $T \underline{\oplus} P$

So, II is true.

28. (*c*) : Given statements : $P > Q$, $M \leq K$, $T = K$.

Relation between T and M :

$T = K$, $K \geq M \Rightarrow T \geq M \Rightarrow T > M$ or $T = M$

$\Rightarrow T \copyright M$ or $T = M$.

So, either I or II is true.

29. (*d*) : Given statements : $S < M$, $M > L$, $L \geq Z$

I. Relation between S and Z :

$S < M$, $M > L$, $L \geq Z \Rightarrow$ no definite conclusion.

So, I is not true.

II. Relation between S and L :

$S < M$, $M > L \Rightarrow$ no definite conclusion.

So, II is also not true.

30. (*d*) : Given statements : $D > F,\ F = S,\ S \leq M$

I. Relation between D and M :
$D > F,\ F = S,\ S \leq M \Rightarrow$ no definite conclusion.
So, I is not true.

II. Relation between F and M :
$F = S, S \leq M \Rightarrow F \leq M.$
So, $F \underline{\odot} M$ *i.e.* $F \geq M$ is not true.
Thus, II is false.

31. (*a*) : Given statements : $J = V,\ V < N,\ R \leq J$

I. Relation between R and N :
$R \leq J,\ J = V,\ V < N \Rightarrow R < N$ *i.e.* $R * N.$
So, I is true.

II. Relation between J and N :
$J = V,\ V < N \Rightarrow J < N$ *i.e.* $J * N.$
So, $J \underline{\odot} N$ *i.e.*, $J \geq N$ is not true.
Thus, II is false.

32. (*b*) : Given statements : $L \geq U,\ C < L,\ C > B$

I. Relation between U and C :
$U \leq L,\ L > C \Rightarrow$ no definite conclusion.
So, I is not true.

II. Relation between L and B :
$L > C,\ C > B \Rightarrow L > B$ *i.e.* $L \odot B.$
So, II is true.

33. (*b*) : Given statements : $G \leq S,\ F \geq S,\ T < G$

I. Relation between F and T :
$F \geq S,\ S \geq G,\ G > T \Rightarrow F > T$ *i.e.* $F * T$
So, I is true.

II. Relation between T and S :
$T < G,\ G \leq S \Rightarrow T < S$ *i.e.* $T \square S.$
So, $T = S$ is not true.
Thus, II is false.

34. (*b*) : Given statements : $M = N,\ N > B,\ B < P$

I. Relation between P and N :
$P > B, B < N \Rightarrow$ no definite conclusion.
So, I is not true.

II. Relation between B and M :
$B < N,\ N = M \Rightarrow B < M$ *i.e.* $B \square M.$
So, II is true.

35. (*a*) : Given statements : $N \leq T,\ T = P.$
Relation between P and N :
$P = T,\ T \geq N \Rightarrow P \geq N \Rightarrow P > N$ or $P = N$
$\Rightarrow P * N$ or $P = N.$
So, either I or II is implicit.

36. (*b*) : Given statements : $P \leq Q,\ M \geq N = P$

I. Relation between M and P :
$M \geq N = P \Rightarrow M \geq P$ *i.e.* $M * P.$
So, I is not true.

II. Relation between N and Q :
$N = P,\ P \le Q \Rightarrow N \le Q$ *i.e.* $N \# Q$.
So, II is true.

37. (*a*) : Given statements : $L \ge M, R \ge T = L$
I. Relation between T and M :
$T = L,\ L \ge M \Rightarrow T \ge M$ *i.e.* $T \bullet M$.
So, I is true.
II. Relation between R and L :
$R \ge T = L \Rightarrow R \ge L$ *i.e.* $R \bullet L$.
So, II is not true.

38. (*e*) : Given statements : $X > Y > Z,\ U > Z = V$
I. Relation between V and U :
$V = Z < U \Rightarrow V < U$ *i.e.* $V \bullet U$.
So, I is true.
II. Relation between X and V :
$X > Y > Z \Rightarrow X > Z$.
Now, $X > Z$ and $Z = V \Rightarrow X > V$ *i.e.* $X @ V$.
So, II is true.

39. (*d*) : Given statements : $G < H \le K,\ H > Q = R$.
I. Relation between G and Q.
$G < H,\ H > Q \Rightarrow$ no definite conclusion.
So, I is not true.
II. Relation between R and G :
$R = Q < H \Rightarrow R < H$.
Now, $R < H$ and $H > G \Rightarrow$ no definite conclusion.
So, II is not true.

40. (*b*) : $6x\ \alpha\ 5y$ and $2y\ \beta\ 3z \Rightarrow 6x = 5y$ and $2y > 3z$

$$\Rightarrow 6x = 5y \text{ and } y > \frac{3z}{2}$$

$$\Rightarrow 6x = 5y \text{ and } 5y > \frac{15z}{2} \Rightarrow 6x > \frac{15z}{2}$$

$$\Rightarrow 12x > 15z \Rightarrow 4x > 5z$$

$$\Rightarrow 4x > 3z \text{ } i.e. \text{ } 4x\ \beta\ 3z.$$

41. (*d*) : $ax\ \gamma\ by,\ bx\ \alpha\ cz$ and $b^2\ \alpha\ ac \Rightarrow ax < by,\ bx = cz$ and $b^2 = ac$.

$$bx = cz \Rightarrow b^2x = bcz \Rightarrow acx = bcz \Rightarrow ax = bz.$$

$$ax < by \Rightarrow bz < by \Rightarrow z < y \Rightarrow y > z \text{ } i.e. \text{ } y\ \beta\ z.$$

42. (*a*) : $abxy\ \alpha\ c^2z,\ bx\ \beta\ ay$ and $b^2\ \alpha\ ac \Rightarrow abxy = c^2z,\ bx > ay,\ b^2 = ac$.

Now, $bx > ay \Rightarrow b^2x > aby$

$$\Rightarrow acx > aby \quad (\because b^2 = ac)$$

$$\Rightarrow cx > by \Rightarrow by < cx.$$

$$c^2z = abxy = axby < axcx \Rightarrow cz < ax^2$$

$$\Rightarrow ax^2 > cz \text{ } i.e. \text{ } ax^2\ \beta\ cz.$$

43. (*c*) : $bcy\ \gamma\ ax,\ cy\ \alpha\ bz$ and $a^2\ \gamma\ bc \Rightarrow bcy < ax,\ cy = bz,\ a^2 < bc$

$cy = bz \Rightarrow c^2y = bcz > a^2z \Rightarrow c^2y > a^2z$.

$ax > bcy > a^2y \Rightarrow ax > a^2y \Rightarrow x > ay$

$\Rightarrow \quad cx > acy \Rightarrow cx > abz \quad (\because cy = bz)$

$\Rightarrow \quad cx \neq abz \; i.e. \; cx \; \delta \; abz.$

44. (*a*) : $a^2x \; \alpha \; byz, czx \; \alpha \; b^2y$ and $c^2z \; \alpha \; axy \Rightarrow a^2x = byz, czx = b^2y, \; c^2z = axy.$

$czx = b^2y \Rightarrow c^2zx = cb^2y \Rightarrow axyx = cb^2y \quad (\because c^2z = axy)$

$\Rightarrow ax^2 = cb^2.$

Now, $a^2x = byz \Rightarrow a^2x^2 = bxyz \Rightarrow a.ax^2 = bxyz$

$\Rightarrow acb^2 = bxyz \quad (\because ax^2 = cb^2)$

$\Rightarrow abc = xyz \; i.e. \; abc \; \alpha \; xyz.$

45. (*a*) : $A + B > C + D, \; C + D > B + E, \; B + E = 2C$

$\Rightarrow A + B > B + E, \; B + E = 2C \Rightarrow A + B > 2C.$

46. (*d*) : $A + D > C + E \Rightarrow A + D > (2B - D) + E \quad (\because C + D = 2B)$

$\Rightarrow A + D > (B + E) + (B - D)$

$\Rightarrow A + D > (C + D) + (B - D)$

$\Rightarrow A + D > B + C.$

47. (*b*) : Clearly, time taken $= \dfrac{\text{sum of lengths of two trains}}{\text{total speed of two trains}}$

$= \dfrac{L_1 + L_2}{V_1 + V_2} = (L_1 \text{"} L_2) \; @ \; (V_1 \text{"} V_2).$

48. (*b*) : Total fare = B + 15% of B + 2% of B + 200

$= B + \dfrac{B \times 15}{100} + \dfrac{B \times 2}{100} + 200$

$= B \text{"} (B * 15) \; @ \; 100 \text{"} (B * 2) \; @ \; 100 \text{"} 200.$

49. (*c*) : Profit percentage $= \dfrac{S - (C + L + T)}{C + L + T} \times 100$

$= \{S' \; (C \text{"} L \text{"} \; T)\} \; @ \; (C \text{"} L \text{"} \; T) * 100$

50. (*e*) : Clearly, total marks $= (T - 2) \times 2 + \dfrac{4K}{3} + 5 \times 2$

$= (T' 2) * 2 \text{"} 4 * K \; @ \; 3 \text{"} 5 * 2.$

51. (*b*) : Marks out of 150 in first periodical = P.

Marks out of 100 in first periodical $= \left(\dfrac{P}{150} \times 100\right).$

Marks out of 180 in second periodical = T.

Marks out of 100 in second periodical $= \left(\dfrac{T}{180} \times 100\right).$

Marks out of 400 in final examination = M.

Marks out of 100 in final examination $= \left(\dfrac{M}{400} \times 100\right).$

$\therefore$ Total marks

$= \left[10\% \text{ of } \left(\dfrac{P}{150} \times 100\right)\right] + \left[15\% \text{ of } \left(\dfrac{T}{180} \times 100\right)\right] + \left[75\% \text{ of } \left(\dfrac{M}{400} \times 100\right)\right]$

$= \left[\dfrac{10}{100} \text{ of } \left(\dfrac{P}{150} \times 100\right)\right] + \left[\dfrac{15}{100} \text{ of } \left(\dfrac{T}{180} \times 100\right)\right] + \left[\dfrac{75}{100} \text{ of } \left(\dfrac{M}{400} \times 100\right)\right]$

$= \left(\dfrac{P}{150} \times 10\right) + \left(\dfrac{T}{180} \times 15\right) + \left(\dfrac{M}{400} \times 75\right)$

$= (P \; @ \; 150 * 10) \text{"} (T \; @ \; 180 * 15) \text{"} (M \; @ \; 400 * 75).$

13. LOGICAL SEQUENCE OF WORDS

In this type of questions, a group of words is given. The candidate is required to arrange these words in a meaningful order such as the sequence of occurrence of events, sequence from a part to the whole, sequence of increasing/decreasing size, value, intensity etc., and then choose the correct sequence accordingly.

Ex. 1. ***Arrange the following in a meaningful sequence :***

1. Consultation 2. Illness 3. Doctor
4. Treatment 5. Recovery

(*a*) 2,3,1,4,5 (*b*) 2,3,4,1,5 (*c*) 4,3,1,2,5 (*d*) 5,1,4,3,2

Sol. We know that **illness** occurs first. One then goes to the **doctor** and after **consultation** with him, undergoes **treatment** to finally attain **recovery.**

Thus, the correct order is 2, 3, 1, 4, 5.

Hence, the answer is (*a*).

Ex. 2. ***Arrange the following in a logical order :***

1. Euphoria 2. Happiness 3. Ambivalence
4. Ecstasy 5. Pleasure

(*a*) 4,1,3,2,5 (*b*) 3,2,5,1,4 (*c*) 2,1,3,4,5 (*d*) 1,4,2,5,3

Sol. All the given words stand for 'Joy', but the intensity increases in the order — Ambivalence, Happiness, Pleasure, Euphoria, Ecstasy.

Thus, the correct order is 3, 2, 5, 1, 4.

Hence, the answer is (*b*).

Ex. 3. ***Arrange the following in a meaningful order, from particular to general :***

1. Family 2. Community 3. Member
4. Locality 5. Country

(*a*) 3,1,2,4,5 (*b*) 3,1,2,5,4 (*c*) 3,1,4,2,5 (*d*) 3,1,4,5,2

(Asstt. Grade, 1996)

Sol. Clearly, a **member** is a part of a **family,** which in turn is a part of **community.** The community lives in a **locality** which lies within a **country.**

Thus, the correct order is 3, 1, 2, 4, 5.

Hence, the answer is (*a*).

EXERCISE 13

Directions (*Questions 1 to 33*) : ***In each of the following questions, arrange the given words in a meaningful sequence and then choose the most appropriate sequence from amongst the alternatives provided below each question.***

1. 1. Birth 2. Death 3. Funeral
4. Marriage 5. Education

(Asstt. Grade, 1995)

(*a*) 4,5,3,1,2 (*b*) 2,3,4,5,1 (*c*) 1,5,4,2,3 (*d*) 1,3,4,5,2

2. 1. Site 2. Plan 3. Rent
4. Money 5. Building

(Central Excise, 1996)

(*a*) 4,1,2,5,3 (*b*) 3,4,2,5,1 (*c*) 2,3,5,1,4 (*d*) 1,2,3,5,4

3. 1. Table 2. Tree 3. Wood
4. Seed 5. Plant **(C.B.I. 1994)**
(*a*) 4,5,3,2,1 (*b*) 4,5,2,3,1 (*c*) 1,3,2,4,5 (*d*) 1,2,3,4,5

4. 1. College 2. Child 3. Salary
4. School 5. Employment **(Central Excise, 1992)**
(*a*) 1,2,4,3,5 (*b*) 2,4,1,5,3 (*c*) 4,1,3,5,2 (*d*) 5,3,2,1,4

5. 1. Reading 2. Composing 3. Writing 4. Printing
(*a*) 1,3,2,4 (*b*) 2,3,4,1 (*c*) 3,1,2,4 (*d*) 3,2,4,1
(Railways, 1995)

6. 1. Cutting 2. Dish 3. Vegetable
4. Market 5. Cooking **(Asstt. Grade, 1994)**
(*a*) 1,2,4,5,3 (*b*) 3,2,5,1,4 (*c*) 4,3,1,5,2 (*d*) 5,3,2,1,4

7. 1. Income 2. Status 3. Education
4. Well-being 5. Job **(S.S.C. 1993)**
(*a*) 1,3,2,5,4 (*b*) 1,2,5,3,4 (*c*) 3,1,5,2,4 (*d*) 3,5,1,2,4

8. 1. Milky way 2. Sun 3. Moon
4. Earth 5. Stars **(C.B.I. 1993)**
(*a*) 4,3,2,5,1 (*b*) 3,4,2,5,1 (*c*) 2,3,4,5,1 (*d*) 1,4,3,2,5

9. 1. Sea 2. Rivulet 3. Ocean
4. River 5. Glacier **(I. Tax & Central Excise, 1995)**
(*a*) 5,4,3,2, 1 (*b*) 5,4,2,3,1 (*c*) 5,2,4,1,3 (*d*) 5,2,1,3,4

10. 1. Poverty 2. Population 3. Death
4. Unemployment 5. Disease **(S.S.C. 1996)**
(*a*) 3,4,2,5,1 (*b*) 2,4,1,5,3 (*c*) 2,3,4,5,1 (*d*) 1,2,3,4,5

11. 1. Yarn 2. Plant 3. Saree
4. Cotton 5. Cloth **(Asstt. Grade, 1996)**
(*a*) 2,4,1,5,3 (*b*) 2,4,3,5,1 (*c*) 2,4,5,1,3 (*d*) 2,4,5,3,1

12. 1. Puberty 2. Adulthood 3. Childhood
4. Infancy 5. Senescence **(U.D.C. 1995)**
(*a*) 5,2,3,4,1 (*b*) 4,3,2,1,5 (*c*) 4,3,1,2,5 (*d*) 2,4,3,1,5

13. 1. Windows 2. Walls 3. Floor
4. Foundation 5. Roof 6. Room **(C.B.I. 1995)**
(*a*) 4,5,3,2,1,6 (*b*) 4,3,5,6,2,1 (*c*) 4,2,1,5,3,6 (*d*) 4,1,5,6,2,3

14. 1. Post-box 2. Letter 3. Envelope
4. Delivery 5. Clearance
(*a*) 3,2,4,5,1 (*b*) 3,2,1,5,4 (*c*) 3,2,1,4,5 (*d*) 2,3,1,4,5

15. 1. Key 2. Door 3. Lock
4. Room 5. Switch on **(Asstt. Grade, 1995)**
(*a*) 5,1,2,4,3 (*b*) 4,2,1,5,3 (*c*) 1,2,3,5,4 (*d*) 1,3,2,4,5

16. 1. Gold 2. Iron 3. Sand
4. Platinum 5. Diamond **(Asstt. Grade, 1997)**
(*a*) 2,4,3,5,1 (*b*) 3,2,1,5,4 (*c*) 4,5,1,3,2 (*d*) 5,4,3,2,1

17. 1. Cut 2. Put on 3. Mark
4. Measure 5. Tailor **(Central Excise, 1994)**
(*a*) 4,3,1,5,2 (*b*) 3,1,5,4,2 (*c*) 2,4,3,1,5 (*d*) 1,3,2,4,5

18. 1. Rainbow 2. Rain 3. Sun
4. Happy 5. Child **(S.S.C. 1993)**
(*a*) 2,1,4,3,5 (*b*) 2,3,1,5,4 (*c*) 4,2,3,5,1 (*d*) 4,5,1,2,3

19. 1. Study 2. Job 3. Examination
4. Earn 5. Apply **(I. Tax & Central Excise, 1992)**
(*a*) 1,2,3,4,5 (*b*) 1,3,2,5,4 (*c*) 1,3,5,4,2 (*d*) 1,3,5,2,4

20. 1. Shoulder 2. Wrist 3. Elbow
4. Palm 5. Finger
(*a*) 5,4,2,3,1 (*b*) 3,4,5,2,1 (*c*) 3,1,4,2,5 (*d*) 2,4,5,3,1

21. 1. Frog 2. Eagle 3. Grasshopper
4. Snake 5. Grass **(S.S.C. 1996)**
(*a*) 5,3,4,2,1 (*b*) 5,3,1,4,2 (*c*) 3,4,2,5,1 (*d*) 1,3,5,2,4

22. 1. Punishment 2. Prison 3. Arrest
4. Crime 5. Judgement **(Asstt. Grade, 1996)**
(*a*) 5,1,2,3,4 (*b*) 4,3,5,2,1 (*c*) 4,3,5,1,2 (*d*) 2,3,1,4,5

23. 1. Child 2. Job 3. Marriage
4. Infant 5. Education **(S.S.C. 1993)**
(*a*) 1,3,5,2,4 (*b*) 3,5,2,1,4 (*c*) 4,1,3,5,2 (*d*) 4,1,5,2,3

24. 1. Mother 2. Child 3. Milk
4. Cry 5. Smile **(Asstt. Grade, 1995)**
(*a*) 1,5,2,4,3 (*b*) 2,4,1,3,5 (*c*) 2,4,3,1,5 (*d*) 3,2,1,5,4

25. 1. Travel 2. Destination 3. Payment
4. Berth/Seat number 5. Reservation
6. Availability of berth/seat for reservation
(*a*) 6,2,5,4,3,1 (*b*) 5,3,4,1,6,2 (*c*) 2,6,3,5,4,1 (*d*) 1,2,5,4,3,6
(Central Excise, 1994)

26. 1. Curd 2. Grass 3. Butter
4. Milk 5. Cow **(Asstt. Grade, 1994)**
(*a*) 5,2,4,1,3 (*b*) 5,2,3,4,1 (*c*) 4,2,5,3,1 (*d*) 2,5,4,3,1

27. 1. Elephant 2. Cat 3. Mosquito
4. Tiger 5. Whale **(Asstt. Grade, 1996)**
(*a*) 1,3,5,4,2 (*b*) 2,5,1,4,3 (*c*) 3,2,4,1,5 (*d*) 5,3,1,2,4

28. 1. Probation 2. Interview 3. Selection
4. Appointment 5. Advertisement 6. Application
(*a*) 5,6,2,3,4,1 (*b*) 5,6,3,2,4,1 (*c*) 5,6,4,2,3,1 (*d*) 6,5,4,2,3,1

29. 1. District 2. Village 3. State 4. Town
(*a*) 2,1,4,3 (*b*) 2,3,4,1 (*c*) 2,4,1,3 (*d*) 3,2,1,4
(S.S.C. 1995)

30. 1. Index 2. Contents 3. Title
4. Chapters 5. Introduction
(*a*) 3,2,5,1,4 (*b*) 2,3,4,5,1 (*c*) 5,1,4,2,3 (*d*) 3,2,5,4,1

31. 1. Country 2. Furniture 3. Forest
4. Wood 5. Trees **(S.S.C. 1993)**
(*a*) 1,3,5,4,2 (*b*) 1,4,3,2,5 (*c*) 2,4,3,1,5 (*d*) 5,2,3,1,4

32. 1. Protect 2. Pressure 3. Relief
4. Rain 5. Flood **(I. Tax & Central Excise, 1994)**
(*a*) 2,4,3,1,5 (*b*) 2,4,5,1,3 (*c*) 2,5,4,1,3 (*d*) 3,2,4,5,1

33. 1. Andhra Pradesh 2. Universe 3. Tirupathi
4. World 5. India **(Asstt. Grade, 1995)**
(*a*) 1,5,3,2,4 (*b*) 2,1,3,5,4 (*c*) 3,1,5,4,2 (*d*) 5,4,2,1,3

34. Arrange the following in a meaningful order : **(C.B.I. 1997)**
Doctor, Fever, Medicine, Medical shop
(*a*) Medicine, Doctor, Medical shop, Fever
(*b*) Doctor, Medical shop, Medicine, Fever
(*c*) Fever, Doctor, Medical shop, Medicine
(*d*) Medical shop, Medicine, Fever, Doctor

35. Which would be the proper order of the following (in ascending order) ?
1. Trillion 2. Thousand 3. Billion
4. Hundred 5. Million **(S.S.C. 1993)**
(*a*) 1,2,4,3,5 (*b*) 1,5,3,2,4 (*c*) 4,2,3,5,1 (*d*) 4,2,5,3,1

36. Which of the following number sequences represents a correct sequence from a part to the whole ?
1. Caste 2. Family 3. Newly married couple
4. Clan 5. Species **(C.B.I. 1993)**
(*a*) 2,3,1,4,5 (*b*) 3,2,1,4,5 (*c*) 3,4,5,1,2 (*d*) 4,5,3,2,1

37. Arrange the following items from general to particular :
1. Animal 2. Feline 3. Leopard
4. Mammal 5. Vertebrate 6. Cat
(*a*) 1,5,4,2,3,6 (*b*) 1,4,3,2,5,6 (*c*) 1,3,5,4,2,6 (*d*) 1,2,3,4,5,6

38. Which number sequence of the following represents a correct sequence from small to big ?
1. Bungalow 2. Flat 3. Cottage
4. House 5. Palace 6. Mansion
(*a*) 3,2,1,4,6,5 (*b*) 3,2,4,1,5,6 (*c*) 3,2,4,1,6,5 (*d*) 5,6,4,1,2,3

ANSWERS

1. (*c*)	**2.** (*a*)	**3.** (*b*)	**4.** (*b*)	**5.** (*d*)	**6.** (*c*)	**7.** (*d*)	**8.** (*b*)	**9.** (*c*)	**10.** (*b*)
11. (*a*)	**12.** (*c*)	**13.** (*c*)	**14.** (*b*)	**15.** (*d*)	**16.** (*b*)	**17.** (*a*)	**18.** (*b*)	**19.** (*d*)	**20.** (*a*)
21. (*b*)	**22.** (*c*)	**23.** (*d*)	**24.** (*b*)	**25.** (*c*)	**26.** (*a*)	**27.** (*c*)	**28.** (*a*)	**29.** (*c*)	**30.** (*d*)
31. (*a*)	**32.** (*b*)	**33.** (*c*)	**34.** (*c*)	**35.** (*d*)	**36.** (*b*)	**37.** (*a*)	**38.** (*c*)		

14. ARITHMETICAL REASONING

TYPE 1 : CALCULATION-BASED PROBLEMS

Ex. 1. In a chess tournament each of six players will play every other player exactly once. How many matches will be played during the tournament ?

(*a*) 12 (*b*) 15 (*c*) 30 (*d*) 36

(C.B.I. 1995)

Sol. Clearly, we will consider the following matches :

(*i*) matches of first player with other 5 players;

(*ii*) matches of second player with 4 players other than the first player;

(*iii*) matches of third player with 3 players other than the first and second players;

(*iv*) matches of fourth player with 2 players other than the first three players; and

(*v*) match of fifth player with the sixth one.

So, number of matches played during the tournament = 5 + 4 + 3 + 2 + 1 = 15.

Ex. 2. A man has a certain number of small boxes to pack into parcels. If he packs 3, 4, 5 or 6 in a parcel, he is left with one over; if he packs 7 in a parcel, none is left over. What is the number of boxes, he may have to pack ?

(*a*) 106 (*b*) 301 (*c*) 309 (*d*) 400

Sol. Clearly, the required number would be such that it leaves a remainder of 1 when divided by 3, 4, 5 or 6 and no remainder when divided by 7. Such a number is 301.

Hence, the answer is (*b*).

Ex. 3. A, B, C and D play a game of cards. A says to B, "If I give you 8 cards, you will have as many as C has and I shall have 3 less than what C has. Also, if I take 6 cards from C, I shall have twice as many as D has." If B and D together have 50 cards, how many cards has A got ? **(Hotel Management, 1997)**

(*a*) 40 (*b*) 37 (*c*) 27 (*d*) 23

Sol. Clearly, we have :

$B + 8 = C$ ...(*i*) $A - 8 = C - 3$ ...(*ii*)

$A + 6 = 2D$ ...(*iii*) $B + D = 50$ ...(*iv*)

Putting $C = A - 5$ from (*ii*) into (*i*), we have :

$B + 8 = A - 5$ or $A - B = 13$ ...(*v*)

Putting $D = 50 - B$ from (*iv*) into (*iii*), we have :

$A + 6 = 100 - 2B$ or $A + 2B = 94$ ...(*vi*)

Solving (*v*) and (*vi*), we get $B = 27$ and $A = 40$.

$\therefore$ A has 40 cards.

Hence, the answer is (*a*).

Ex. 4. In a group of cows and hens, the number of legs are 14 more than twice the number of heads. The number of cows is

(*a*) 5 (*b*) 7 (*c*) 10 (*d*) 12

Sol. Let the number of cows be x and the number of hens be y. Then,
number of legs in the group $= 4x + 2y$.
number of heads in the group $= x + y$.
So, $4x + 2y = 2(x + y) + 14$ or $4x + 2y = 2x + 2y + 14$ or $2x = 14$ or $x = 7$.
$\therefore$ Number of cows = 7.
Hence, the answer is (*b*).

Ex. 5. A worker may claim Rs 15 for each km which he travels by taxi and Rs 5 for each km which he drives his own car. If in one week he claimed Rs 500 for travelling 80 km how many kms did he travel by taxi ?
(*a*) 10 (*b*) 20 (*c*) 30 (*d*) 40

Sol. Let the distance covered by taxi be x km.
Then, distance covered by car $= (80 - x)$ km.
$15x + 5(80 - x) = 500$ or $15x + 400 - 5x = 500$ or $10x = 100$ or $x = 10$.
$\therefore$ Distance covered by taxi = 10 km.
Hence, the answer is (*a*).

TYPE 2 : DATA-BASED QUESTIONS

Ex. 6. The following questions are based on the given data for an examination.

(A)	Candidates appeared	10500
(B)	Passed in all the five subjects	5685
(C)	Passed in three subjects only	1498
(D)	Passed in two subjects only	1250
(E)	Passed in one subject only	835
(F)	Failed in English only	78
(G)	Failed in Maths only	275
(H)	Failed in Physics only	149
(I)	Failed in Chemistry only	147
(J)	Failed in Biology only	221

Q. 1. How many candidates failed in all the subjects ?
(*a*) 4815 (*b*) 3317 (*c*) 2867 (*d*) 362

Sol. Clearly, candidates failed in all the subjects
= (Candidates appeared) – (Candidates failed in 1, 2, 3 or 5 subjects + Candidates failed in 1 subject only)
= 10500 – (5685 + 1498 + 1250 + 835 + 78 + 275 + 149 + 147 + 221)
= 10500 – 10138 = 362.
Hence, the answer is (*d*).

Q. 2. How many candidates passed at least in four subjects ?
(*a*) 6555 (*b*) 5685 (*c*) 1705 (*d*) 870

Sol. Candidates passed at least in four subjects
= (Candidates passed in 4 subjects) + (Candidates passed in all 5 subjects)
= (Candidates failed in only 1 subject) + (Candidates passed in all 5 subjects)
= (78 + 275 + 149 + 147 + 221) + 5685
= 870 + 5685 = 6555.
Hence, the answer is (*a*).

Q. 3. How many candidates failed because of having failed in four or less subjects ?

(*a*) 4815 (*b*) 4453 (*c*) 3618 (*d*) 2368

Sol. Candidates failed in four or less subjects

= (Candidates failed in only 1 subject) + (Candidates failed in only 2 subjects) + (Candidates failed in only 3 subjects) + (Candidates failed in only 4 subjects)

= (Candidates failed in only 1 subject) + (Candidates passed in only 3 subjects) + (Candidates passed in only 2 subjects) + (Candidates passed in only 1 subject)

$= (78 + 275 + 149 + 147 + 221) + 1498 + 1250 + 835$

$= 4453.$

Hence, the answer is (*b*).

TYPE 3 : PROBLEMS ON AGES

Ex. 7. Reena is twice as old as Sunita. Three years ago, she was three times as old as Sunita. How old is Reena now ? **(I. Tax & Central Excise, 1995)**

(*a*) 6 years (*b*) 7 years (*c*) 8 years (*d*) 12 years

Sol. Let Sunita's present age be x years.

Then, Reena's present age = $2x$ years.

Three years ago, Sunita's age = $(x - 3)$ and Reena's age = $(2x - 3)$.

So, $(2x - 3) = 3(x - 3)$ or $2x - 3 = 3x - 9$ or $x = 6$.

$\therefore$ Reena's present age = $2x = 12$ years.

Hence, the answer is (*d*).

Ex. 8. The age of a father is twice that of the elder son. Ten years hence the age of the father will be three times that of the younger son. If the difference of ages of the two sons is 15 years, the age of the father is

(*a*) 50 years (*b*) 55 years (*c*) 60 years (*d*) 70 years

Sol. Let the age of the elder son be x.

Then, age of younger son = $(x - 15)$; and

age of the father = $2x$.

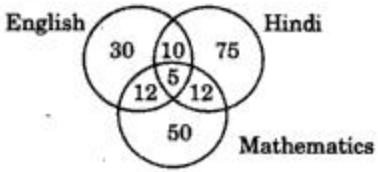
So, $2x + 10 = 3(x - 15 + 10)$ or $2x + 10 = 3x - 15$ or $x = 25$.

$\therefore$ Father's age = $2x = 50$ years.

Hence, the answer is (*a*).

TYPE 4 : VENN-DIAGRAM BASED QUESTIONS

Ex. 9. Consider the diagram given below : **(I.A.S. 1994)**



Five hundred candidates appeared in an examination comprising of tests in English, Hindi and Mathematics. The diagram gives the number of candidates who failed in different tests. What is the percentage of candidates who failed in at least two subjects ?

(*a*) 0.078 (*b*) 1.0 (*c*) 6.8 (*d*) 7.8

Sol. Clearly, number of candidates who failed in at least two subjects
= number of candidates who failed in two or more subjects
$= (10 + 12 + 12 + 5) = 39.$

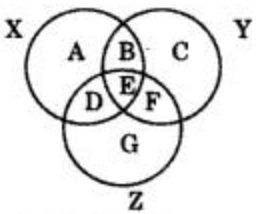
$\therefore$ Required percentage $= \left(\frac{39}{500} \times 100\right)\% = 7.8\%.$

Hence, the answer is (*d*).

Ex. 10. In a group of persons travelling in a bus, 6 persons can speak Tamil, 15 can speak Hindi and 6 can speak Gujarati. In that group, none can speak any other language. If 2 persons in the group can speak two languages and one person can speak all the three languages, then how many persons are there in the group ? **(I.A.S. 1997)**

(*a*) 21 (*b*) 22 (*c*) 23 (*d*) 24

Sol. Let circles X, Y, and Z represent persons who can speak Tamil, Hindi and Gujarati respectively.



Tamil-speaking persons = A + B + D + E = 6 ...(*i*)
Hindi-speaking persons = B + C + E + F = 15 ...(*ii*)
Gujarati-speaking persons = D + E + F + G = 6 ...(*iii*)
Persons speaking 2 languages = B + D + F = 2 ...(*iv*)
Persons speaking all 3 languages = E = 1 ...(*v*)
Clearly, we have : A + B + D = 5 ...(*vi*)
B + C + F = 14 ...(*vii*)
D + F + G = 5 ...(*viii*)
B + D + F = 2 ...(*ix*)
Subtracting (*ix*) from (*vi*), we get :
A − F = 3 ...(*x*)
Adding (*vii*) and (*viii*), we get :
B + C + D + 2F + G = 19 ...(*xi*)
Adding (*x*) and (*xi*), we get :
A + B + C + D + F + G = 22
or A + B + C + D + E + F + G = 23. ($\because$ E = 1)
$\therefore$ Total number of persons = 23.
Hence, the answer is (*c*).

EXERCISE 14

1. A shepherd had 17 sheep. All but nine died. How many was he left with ?

(*a*) Nil (*b*) 8 (*c*) 9 (*d*) 17

(Railways, 1995)

2. A bird shooter was asked how many birds he had in the bag. He replied that there were all sparrows but six, all pigeons but six, and all docks but six. How many birds had he in all ?

(*a*) 9 (*b*) 18 (*c*) 27 (*d*) 36

3. What is the smallest number of ducks that could swim in this formation — two ducks in front of a duck, two ducks behind a duck and a duck between two ducks ?

(*a*) 3 (*b*) 5 (*c*) 7 (*d*) 9

4. A group of 1200 persons consisting of captains and soldiers is travelling in a train. For every 15 soldiers there is one captain. The number of captains in the group is **(Hotel Management, 1992)**

(*a*) 85 (*b*) 80 (*c*) 75 (*d*) 70

5. Aruna cut a cake into two halves and cuts one half into smaller pieces of equal size. Each of the small pieces is twenty grams in weight. If she has seven pieces of the cake in all with her, how heavy was the original cake ? **(L.I.C. 1994)**

(*a*) 120 grams (*b*) 140 grams (*c*) 240 grams
(*d*) 280 grams (*e*) None of these

6. First bunch of bananas has $\frac{1}{4}$ again as many bananas as a second bunch. If the second bunch has 3 bananas less than the first bunch, then the number of bananas in the first bunch are **(S.C.R.A. 1996)**

(*a*) 9 (*b*) 10 (*c*) 12 (*d*) 15

7. At the end of a business conference the ten people present all shake hands with each other once. How many handshakes will there be altogether ? **(M.B.A. 1997)**

(*a*) 20 (*b*) 45 (*c*) 55 (*d*) 90

8. A student got twice as many sums wrong as he got right. If he attempted 48 sums in all, how many did he solve correctly ? **(M.B.A. 1994)**

(*a*) 12 (*b*) 16 (*c*) 24 (*d*) 18

9. The number of boys in a class is three times the number of girls. Which one of the following numbers cannot represent the total number of children in the class ? **(S.C.R.A. 1993)**

(*a*) 48 (*b*) 44 (*c*) 42 (*d*) 40

10. A placed three sheets with two carbons to get two extra copies of the original. Then he decided to get more carbon copies and folded the paper in such a way that the upper half of the sheets were on top of the lower half. Then he typed. How many carbon copies did he get ?

(*a*) 1 (*b*) 2 (*c*) 3 (*d*) 4

11. A motorist knows four different routes from Bristol to Birmingham. From Birmingham to Sheffield he knows three different routes and from Sheffield to Carlisle he knows two different routes. How many routes does he know from Bristol to Carlisle ?

(*a*) 4 (*b*) 8 (*c*) 12 (*d*) 24

12. In a class, there are 18 boys who are over 160 cm tall. If these constitute three-fourths of the boys and the total number of boys is two-thirds of the total number of students in the class, what is the number of girls in the class ? **(I.A.S. 1992)**

(*a*) 6 (*b*) 12 (*c*) 18 (*d*) 24

13. A bus starts from city X. The number of women in the bus is half of the number of men. In city Y, 10 men leave the bus and five women enter. Now, number of men and women is equal. In the beginning, how many passengers entered the bus ? **(I. Tax & Central Excise, 1985)**

(*a*) 15 (*b*) 30 (*c*) 36 (*d*) 45

14. In a class, 20% of the members own only two cars each, 40% of the remaining own three cars each and the remaining members own only one car each. Which of the following statements is definitely true from the given statements ?

(*a*) Only 20% of the total members own three cars each.

(*b*) 48% of the total members own only one car each.

(*c*) 60% of the total members own at least two cars each.

(*d*) 80% of the total members own at least one car.

(*e*) None of these **(Bank P.O. 1998)**

15. Between two book-ends in your study are displayed your five favourite puzzle books. If you decide to arrange the five books in every possible combination and moved just one book every minute, how long would it take you ?

(*a*) 1 hour (*b*) 2 hours (*c*) 3 hours (*d*) 4 hours

16. I have a few sweets to be distributed. If I keep 2, 3 or 4 in a pack, I am left with one sweet. If I keep 5 in a pack, I am left with none. What is the minimum number of sweets I can have to pack and distribute ? **(Assistant Grade, 1992)**

(*a*) 25 (*b*) 37 (*c*) 54 (*d*) 65

17. Mr. Johnson was to earn £ 300 and a free holiday for seven weeks' work. He worked for only 4 weeks and earned £ 30 and a free holiday. What was the value of the holiday ?

(*a*) £ 300 (*b*) £ 330 (*c*) £ 360 (*d*) £ 420

18. In a cricket match, five batsmen A, B, C, D and E scored an average of 36 runs. D scored 5 more than E; E scored 8 fewer than A; B scored as many as D and E combined; and B and C scored 107 between them. How many runs did E score ?

(*a*) 62 (*b*) 45 (*c*) 28 (*d*) 20

19. Mac has £ 3 more than Ken, but then Ken wins on the horses and trebles his money, so that he now has £ 2 more than the original amount of money that the two boys had between them. How much money did Mac and Ken have between them before Ken's win ?

(*a*) £ 9 (*b*) £ 11 (*c*) £ 13 (*d*) £ 15

20. Robin says, "If Jai gives me Rs 40, he will have half as much as Atul, but if Atul gives me Rs 40, then the three of us will all have the same amount." What is the total amount of money that Robin, Jai and Atul have between them ?

(*a*) Rs 240 (*b*) Rs 320 (*c*) Rs 360 (*d*) Rs 420

21. A, B, C, D and E play a game of cards. A says to B, "If you give me three cards you will have as many as E has and if I give you three cards, you will have as many as D has." A and B together have 10 cards more than what D and E together have. If B has two cards more than what C has and the total number of cards be 133, how many cards does B have ? **(Hotel Management, 1995)**

(*a*) 22 (*b*) 23 (*c*) 25 (*d*) 35

22. A, B, C, D and E play a game of cards. A says to B, "If you give me 3 cards, you will have as many as I have at this moment while if D takes 5 cards from you, he will have as many as E has." A and C together have twice as many cards as E has. B and D together also have the same number of cards as A and C taken together. If together they have 150 cards, how many cards has C got ?

(*a*) 28 (*b*) 29 (*c*) 31 (*d*) 35

(C.A.T. 1997)

23. In a caravan in addition to 50 hens, there are 45 goats and 8 camels with some keepers. If the total number of feet be 224 more than the number of heads in the caravan, the number of keepers is **(Hotel Management, 1995)**

(*a*) 5 (*b*) 8 (*c*) 10 (*d*) 15

24. A certain number of horses and an equal number of men are going somewhere. Half of the owners are on their horses' back while the remaining ones are walking along leading their horses. If the number of legs walking on the ground is 70, how many horses are there ? **(Railways, 1998)**

(*a*) 10 (*b*) 12 (*c*) 14 (*d*) 16

25. At a farm, there are hens, cows and bullocks, and keepers to look after them. There are 69 heads less than legs; the number of cows is double of that of the bullocks; the number of cows and hens is the same and there is one keeper per ten birds and cattle. The total number of hens plus cows and bullocks and their keepers does not exceed 50. How many cows are there ?

(*a*) 10 (*b*) 12 (*c*) 14 (*d*) 16

26. In a certain office, $\frac{1}{3}$ of the workers are women, $\frac{1}{2}$ of the women are married and $\frac{1}{3}$ of the married women have children. If $\frac{3}{4}$ of the men are married and $\frac{2}{3}$ of the married men have children, what part of workers are without children ?

(*a*) $\frac{5}{18}$ (*b*) $\frac{4}{9}$ (*c*) $\frac{11}{18}$ (*d*) $\frac{17}{36}$

27. In an examination, a student scores 4 marks for every correct answer and loses 1 mark for every wrong answer. If he attempts all 75 questions and secures 125 marks, the number of questions he attempts correctly, is

(*a*) 35 (*b*) 40 (*c*) 42 (*d*) 46

Directions (*Questions 28 to 32*) : *The following questions are based on the information given below :* **(Hotel Management, 1997)**

Data on 450 candidates, who took an examination in Social Sciences, Mathematics and Science is given below :

Passed in all the subjects	167
Failed in all the subjects	60
Failed in Social Sciences	175
Failed in Mathematics	199
Failed in Science	191
Passed in Social Sciences only	62
Passed in Mathematics only	48
Passed in Science only	52

28. How many failed in Social Sciences only ?
(*a*) 15 (*b*) 21 (*c*) 30 (*d*) 42

29. How many failed in one subject only ?
(*a*) 152 (*b*) 144 (*c*) 61 (*d*) 56

30. How many passed in Mathematics and at least one more subject ?
(*a*) 210 (*b*) 203 (*c*) 170 (*d*) 94

31. How many failed in two subjects only ?
(*a*) 56 (*b*) 61 (*c*) 152 (*d*) 162

32. How many passed at least in one subject ?
(*a*) 450 (*b*) 390 (*c*) 304 (*d*) 167

33. A is three times as old as B. C was twice as old as A four years ago. In four years' time, A will be 31. What is the present age of B and C ?
(*a*) 9, 46 (*b*) 9, 50 (*c*) 10, 46 (*d*) 10, 50
(Assistant Grade, 1997)

34. A father tells his son, "I was of your present age when you were born." If the father is 36 now, how old was the boy 5 years back ? **(Railways, 1994)**
(*a*) 13 (*b*) 15 (*c*) 17 (*d*) 20

35. In a family, a couple has a son and a daughter. The age of the father is three times that of his daughter and the age of the son is half of his mother. The wife is 9 years younger to her husband and the brother is seven years older than his sister. What is the age of the mother ? **(I.A.S. 1998)**
(*a*) 40 years (*b*) 45 years (*c*) 50 years (*d*) 60 years

36. A father is now three times as old as his son. Five years back, he was four times as old as his son. The age of the son is **(I.A.S. 1993)**
(*a*) 12 (*b*) 15 (*c*) 18 (*d*) 20

37. Ravi's brother is 3 years senior to him. His father was 28 years of age when his sister was born while his mother was 26 years of age when he was born. If his sister was 4 years of age when his brother was born, what was the age of Ravi's father and mother respectively when his brother was born ?
(*a*) 32 years, 23 years (*b*) 32 years, 29 years
(*c*) 35 years, 29 years (*d*) 35 years, 33 years
(Hotel Management, 1995)

38. When Rahul was born, his father was 32 years older than his brother and his mother was 25 years older than his sister. If Rahul's brother is 6 years older than him and his mother is 3 years younger than his father, how old was Rahul's sister when he was born ? **(Hotel Management, 1997)**
(*a*) 7 years (*b*) 10 years (*c*) 14 years (*d*) 19 years

39. In a town, 65% people watched the news on television, 40% read a newspaper and 25% read a newspaper and watched the news on television also. What percent of the people neither watched the news on television nor read a newspaper ?
(*a*) 5 (*b*) 10 (*c*) 15 (*d*) 20

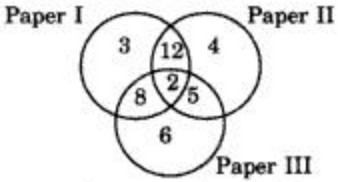
40. In a group of 15 people, 7 read French, 8 read English while 3 of them read none of these two. How many of them read French and English both ?
(*a*) 0 (*b*) 3 (*c*) 4 (*d*) 5
(I. Tax & Central Excise, 1995)

41. There are 50 students admitted to a nursery class. Some students can speak only English and some can speak only Hindi. Ten students can speak both English and Hindi. If the number of students who can speak English is 21, then how many students can speak Hindi, how many can speak only Hindi and how many can speak only English ? **(I.A.S. 1998)**

(*a*) 39, 29 and 11 respectively (*b*) 37, 27 and 13 respectively

(*c*) 28, 18 and 22 respectively (*d*) 21, 11 and 29 respectively

42. Consider the Venn diagram given below : **(I.A.S. 1993)**



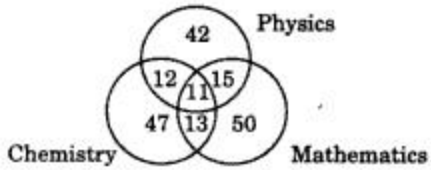
The number in the Venn diagram indicates the number of persons reading the newspapers. The diagram is drawn after surveying 50 persons. In a population of 10,000, how many can be expected to read at least two newspapers ?

(*a*) 5000 (*b*) 5400 (*c*) 6000 (*d*) 6250

43. Out of a total of 120 musicians in a club, 5% can play all the three instruments — guitar, violin and flute. It so happens that the number of musicians who can play any two and only two of the above instruments is 30. The number of musicians who can play the guitar alone is 40. What is the total number of those who can play violin alone or flute alone ? **(I.A.S. 1995)**

(*a*) 30 (*b*) 38 (*c*) 44 (*d*) 45

Directions (*Questions 44 to 46*) : *The diagram given below shows the number of students who got distinction in three subjects out of 500 students. Study the diagram carefully and answer the questions that follow.*



44. What is the percentage of students who got distinction in two subjects ?

(*a*) 8% (*b*) 9% (*c*) 10% (*d*) 12%

45. What is the percentage of students who got distinction ?

(*a*) 28% (*b*) 35% (*c*) 38% (*d*) 40%

46. The percentage of students with distinction marks in Mathematics is

(*a*) 17.8% (*b*) 18.6% (*c*) 19.2% (*d*) 20.6%

Directions (*Questions 47 to 49*) : *Study the information given below and answer the questions that follow :*

A publishing firm publishes newspapers A, B and C. In an effort to persuade advertisers to insert advertisements in these newspapers, the firm sends out the following statement to possible advertisers :

A survey of representative sample of the whole population shows that —
Newspaper A is read by 26%;
Newspaper B is read by 25%;
Newspaper C is read by 14%;
Newspaper A and B are read by 11%;
Newspaper B and C are read by 10%;
Newspaper C and A are read by 9%;
Newspaper C only is read by 0%.

47. The percentage of readers who read all the three newspapers is
(*a*) 1 (*b*) 4 (*c*) 5 (*d*) 6

48. The percentage of readers who read A and B but not C, is
(*a*) 2 (*b*) 4 (*c*) 5 (*d*) 6

49. The percentage of readers who read at least one of the three newspapers is
(*a*) 40 (*b*) 50 (*c*) 60 (*d*) 65

50. A number of friends decided to go on a picnic and planned to spend Rs 96 on eatables. Four of them, however, did not turn up. As a consequence, the remaining ones had to contribute Rs 4 each extra. The number of those who attended the picnic was
(*a*) 8 (*b*) 12 (*c*) 16 (*d*) 24

ANSWERS

1. (*c*) : 'All but nine died' means 'All except nine died' *i.e.* nine sheep remained alive.

2. (*a*) : 'There were all sparrows but six' means that six birds were not sparrows but only pigeons and docks.
Similarly, number of sparrows + number of docks = 6
and number of sparrows + number of pigeons = 6.
This is possible when there are 3 sparrows, 3 pigeons and 3 docks *i.e.* 9 birds in all.

3. (*a*) : Clearly, the smallest such number is 3.
Three ducks can be arranged as shown along side to satisfy all the three given conditions.

D
D
D

4. (*c*) : Clearly, out of every 16 persons, there is one captain.

So, number of captains $= \frac{1200}{16} = 75$.

5. (*c*) : The seven pieces consist of 6 smaller equal pieces and one half cake piece.
Weight of each small piece = 20 g.
So, total weight of the cake = $2 \times (20 \times 6) = 240$ g.

6. (*d*) : Let the number of bananas in the second bunch be x.

Then, number of bananas in the first bunch $= x + \frac{1}{4}x = \frac{5}{4}x$.

So, $\frac{5}{4}x - x = 3 \Rightarrow 5x - 4x = 12 \Rightarrow x = 12$.

$\therefore$ Number of bananas in first bunch $= \left(\frac{5}{4} \times 12\right) = 15$.

7. (*b*) : Clearly, total number of handshakes $= (9 + 8 + 7 + 6 + 5 + 4 + 3 + 2 + 1) = 45$.

8. (*b*) : Suppose the boy got x sums right and $2x$ sums wrong. Then,
$x + 2x = 48$ or $3x = 48$ or $x = 16$.

9. (*c*) : Let number of girls = x and number of boys = $3x$.
Then, $3x + x = 4x$ = total number of students.
Thus, to find exact value of x, the total number of students must be divisible by 4.

10. (*b*) : Since the number of carbons is 2, only two copies can be obtained.

11. (*d*) : Total number of routes from Bristol to Carlisle = $(4 \times 3 \times 2) = 24$.

12. (*b*) : Let the number of boys be x.
Then, $\frac{3}{4}x = 18$ or $x = 18 \times \frac{4}{3} = 24$.
If total number of students is y, then
$\frac{2}{3}y = 24$ or $y = 24 \times \frac{3}{2} = 36$.
$\therefore$ Number of girls in the class = $(36 - 24) = 12$.

13. (*d*) : Originally, let the number of women = x.
Then, number of men = $2x$.
So, in city Y, we have :
$(2x - 10) = (x + 5)$ or $x = 15$.
$\therefore$ Total number of passengers in the beginning = $(x + 2x) = 3x = 45$.

14. (*b*) : Let total number of members be 100.
Then, number of members owning only 2 cars = 20.
Number of members owning 3 cars = 40% of 80 = 32.
Number of members, owning only 1 car = $100 - (20 + 32) = 48$.
Thus, 48% of the total members own one car each.

15. (*b*) : Clearly, number of ways of arranging 5 books = $5! = 5 \times 4 \times 3 \times 2 \times 1 = 120$.
So, total time taken = 120 minutes = 2 hours.

16. (*a*) : Clearly, the required number would be such that it leaves a remainder of 1 when divided by 2, 3 or 4 and no remainder when divided by 5. Such a number is 25.

17. (*b*) : Let the value of the holiday be x.
Then, pay for seven weeks' work = £ $300 + x$.
Pay for one weeks' work = $\frac{£\ 300 + x}{7}$.
So, $\frac{£\ 300 + x}{7} \times 4 = £\ 30 + x$
or £ $1200 + 4x$ = £ $210 + 7x$ or $3x$ = £ 990 or £ 330.

18. (*d*) : Total runs scored = $(36 \times 5) = 180$.
Let the runs scored by E be x.
Runs scored by D = $x + 5$.
Runs scored by A = $x + 8$.
Runs scored by B = $x + x + 5 = 2x + 5$.
Runs scored by C = $(107 - B) = 107 - (2x + 5) = 102 - 2x$.
So, total runs = $(x + 8) + (2x + 5) + (102 - 2x) + (x + 5) + x = 3x + 120$
$\therefore$ $3x + 120 = 180$ or $3x = 60$ or $x = 20$.
Thus, runs scored by E = 20.

19. (*c*) : Let money with Ken = x.
Then, money with Mac = x + £ 3.
Now, $3x = (x + x + £\ 3) + £\ 2$ or $x = £\ 5$.
$\therefore$ Total money with Mac and Ken = $2x$ + £ 3 + £ 5 = £ 13.

20. (c) : Clearly, we have :

$J - 40 = \frac{1}{2}A$ ...(i) $A - 40 = J$ ...(ii)

$A - 40 = R + 40$ ...(iii)

Solving (i) and (ii) simultaneously, we get : $J = 120$ and $A = 160$.

Putting $A = 160$ in (iii), we get $R = 80$.

$\therefore$ Total money $= R + J + A = Rs\,(80 + 120 + 160) = Rs\,360$.

21. (c) : Clearly, we have :

$B - 3 = E$ ...(i) $B + 3 = D$ ...(iii)

$A + B = D + E + 10$ ...(iii) $B = C + 2$ ...(iv)

$A + B + C + D + E = 133$ ...(v)

From (i) and (ii), we have : $2B = D + E$ ...(vi)

From (iii) and (vi), we have : $A = B + 10$ ...(vii)

Using (iv), (vi) and (vii) in (v), we get :

$(B + 10) + B + (B - 2) + 2B = 133$ or $5B = 125$ or $B = 25$

22. (a) : Clearly, we have :

$A = B - 3$ ...(i) $D + 5 = E$ ...(ii)

$A + C = 2E$ ...(iii) $B + D = A + C = 2E$ ...(iv)

$A + B + C + D + E = 150$ ...(v)

From (iii), (iv) and (v), we get : $5E = 150$ or $E = 30$.

Putting $E = 30$ in (ii), we get : $D = 25$.

Putting $E = 30$ and $D = 25$ in (iv), we get : $B = 35$.

Putting $B = 35$ in (i), we get $A = 32$.

Putting $A = 32$ and $E = 30$ in (iii), we get : $C = 28$.

23. (d) : Let number of keepers be x.

Then, total number of feet $= 2 \times 50 + 4 \times 45 + 4 \times 8 + 2x = 2x + 312$.

total number of heads $= 50 + 45 + 8 + x = 103 + x$.

Now, $(2x + 312) = (103 + x) + 224$ or $x = 15$.

24. (c) : Let number of horses = number of men $= x$.

Then, number of legs $= 4x + 2 \times \frac{x}{2} = 5x$.

So, $5x = 70$ or $x = 14$.

25. (b) : Let the number of hens, cows, bullocks and keepers be represented by H, C, B and K respectively.

Then, we have :

number of heads $= H + C + B + K$

number of legs $= 2H + 4C + 4B + 2K$

So, $H + C + B + K + 69 = 2H + 4C + 4B + 2K$

or $H + C + B + K + 69 = 4(H + C + B) + 2K - 2H$ ...(i)

Also, $C = 2B$ ...(ii)

$C = H$ ...(iii)

$H + C + B = 10K$ ...(iv)

$H + C + B + K \leq 50$ ...(v)

Putting $H + C + B = 10K$ in (i), we get :

$11K + 69 = 42K - 2H$ or $31K - 2H = 69$ or $2H = 31K - 69$ ...(vi)

Putting $H + C + B = 10K$ in (v), we get $11K \leq 50$ or $K \leq 5$.

Thus, $K = 1, 2, 3$ or 4.

Putting K = 1 or 2, we get negative values of H, which is not possible.
Putting K = 4, we get fractional value of H, which is also not possible.
Putting K = 3, we get : H = 12.
So, C = H = 12.

26. (*c*) : Let the total number of workers be x. Then,

number of women $= \frac{x}{3}$ and number of men $= \frac{2x}{3}$.

Women having children $= \frac{1}{3}$ of $\frac{1}{2}$ of $\frac{1}{3}x = \frac{x}{18}$.

Men having children $= \frac{2}{3}$ of $\frac{3}{4}$ of $\frac{2x}{3} = \frac{x}{3}$.

Workers having children $= \left(\frac{x}{18} + \frac{x}{3}\right) = \frac{7x}{18}$.

Workers having no children $= \left(x - \frac{7x}{18}\right) = \frac{11x}{18}$

$= \frac{11}{18}$ of all workers.

27. (*b*) : Let the number of correct answers be x.
Number of incorrect answers = $(75 - x)$.

$4x - (75 - x) = 125$ or $5x = 200$ or $x = 40$.

28. (*a*) : Candidates failed in Social Sciences only
= (Candidates failed in Social Sciences) – (Candidates failed in all the subjects + Candidates passed in Science only + Candidates passed in Maths only)
= 175 – (60 + 52 + 48) = 175 – 160 = 15.

29. (*c*) : Candidates failed in one subject only
= (Total number of candidates) – (Candidates passed in all the subjects + Candidates failed in all the subjects + Candidates passed in one subject only)
= 450 – (167 + 60 + 62 + 48 + 52)
= 450 – 389 = 61.

30. (*b*) : Candidates failed in Science only = 191 – (62 + 60 + 48) = 21.
Candidates failed in Social Sciences only = 15
∴ Candidates passed in Maths and at least one more subject = (21 + 15 + 167) = 203.

31. (*d*) : Candidates failed in two subjects only
= Candidates passed in one subject only
= 62 + 48 + 52 = 162.

32. (*b*) : Candidates passed at least in one subject
= (Candidates passed in only 1 subject) + (Candidates passed in only 2 subjects) + (Candidates passed in all the subjects)
= (Candidates failed in only 2 subjects) + (Candidates failed in only 1 subject) + (Candidates passed in all the subjects)
= 162 + 61 + 167 = 390.

33. (*b*) : Clearly, we have :

$A = 3B$ ...(*i*) $C - 4 = 2(A - 4)$ ...(*ii*)

Also, $A + 4 = 31$ or $A = 31 - 4 = 27$.
Putting A = 27 in (*i*), we get : B = 9.
Putting A = 27 in (*ii*), we get : C = 50.

34. (*a*) : Let the father's age be x and the son's age be y. Then,

$x - y = y$ or $x = 2y$

Now, $x = 36$. So, $2y = 36$ or $y = 18$.

∴ Son's present age = 18 years.

So, son's age 5 years ago = 13 years.

35. (*d*) : Let the daughter's age be x. Then, father's age = $3x$.

Mother's age = $3x - 9$; Son's age = $x + 7$.

So, $(x + 7) = \frac{3x - 9}{2}$ or $2x + 14 = 3x - 9$ or $x = 23$.

∴ Mother's age = $(3x - 9) = (69 - 9) = 60$ years.

36. (*b*) : Let son's age be x. Then, father's age = $3x$.

Five years ago, father's age = $3x - 5$ and son's age = $x - 5$.

So, $3x - 5 = 4(x - 5)$ or $3x - 5 = 4x - 20$ or $x = 15$.

37. (*a*) : When Ravi's brother was born,

let Ravi's father's age = x and mother's age = y.

Then, sister's age = $x - 28 = 4$ *i.e.* $x = 32$.

Ravi's age = $y - 26$.

Age of Ravi's brother = $y - 26 + 3 = y - 23$.

Now, when Ravi's brother was born, his age = 0. *i.e.* $y - 23 = 0$ or $y = 23$.

38. (*b*) : When Rahul was born,

his brother's age = 6 years;

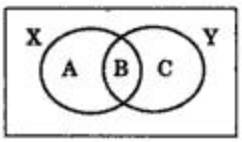
his father's age = $(6 + 32)$ years = 38 years;

his mother's age = $(38 - 3)$ years = 35 years;

his sister's age = $(35 - 25)$ years = 10 years.

39. (*d*) : Let the total number of people be 100.

Let circle X represent people who watched television and Y represent people who read newspaper.



Then, $A + B = 65$, $B + C = 40$, $B = 25$.

Solving, we get : $A = 40$, $B = 25$, $C = 15$.

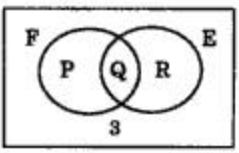
∴ Number of persons who neither watched television nor read newspaper

$= 100 - (A + B + C) = 100 - (40 + 25 + 15)$

$= 100 - 80 = 20$.

So, required percentage = 20%.

40. (*b*) : Let circles F and E represent people who read French and English respectively.



Now, $(P + Q + R) + 3 = 15$ or $P + Q + R = 12$ ...(*i*)

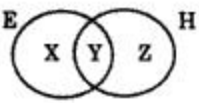
Also, $P + Q = 7$, $Q + R = 8$.

Adding, we get : $P + 2Q + R = 15$. ...(*ii*)

Subtracting (*i*) from (*ii*), we get $Q = 3$.

∴ Number of people who read French and English both = 3.

41. (*a*) : Let circles E and H represent students who can speak English and Hindi respectively.



Number of students who can speak both English and Hindi = Y = 10.

Number of students who can speak English = X + Y = 21.