IAS 100

A Civil Services Chronicle Initiative

LOGICAL REASONING

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1 BLOOD RELATIONS AND FAMILY TREE

Blood relation is an interesting chapter and especially when you get a grab of it it's one thing that can fetch you 100% marks undoubtedly and can also save your time. Initially you might find it a set of really crazy problems driving you mad but the important thing is you should know how to solve them and that's something we shall be discussing here.

It's very important for blood relation questions that you get a fair and clear idea of what is given and what is being asked in the question. And drawing a family tree makes it easier for you to get a fair idea of the same. Get it clear in front of you and you'll very easily get the accurate answer without straining your nerves. Also practice as many questions as you can regularly. Don't worry if initially you are not able to get the speed, with more and more practice you'll be able to make up to the time limit as well.

The questions which are asked in this section depend upon ***Relation***. You should have a sound knowledge of the blood relation in order to solve the questions.

The efficiency in doing the problems of blood relations depends upon the knowledge of the blood relations. Some of the important relations are given below,

1. Relations of Paternal side:

- Father's father → Grandfather
- Father's mother → Grandmother
- Father's brother → Uncle
- Father's sister → Aunt
- Children of uncle → Cousin
- Wife of uncle → Aunt
- Children of aunt → Cousin
- Husband of aunt → Uncle

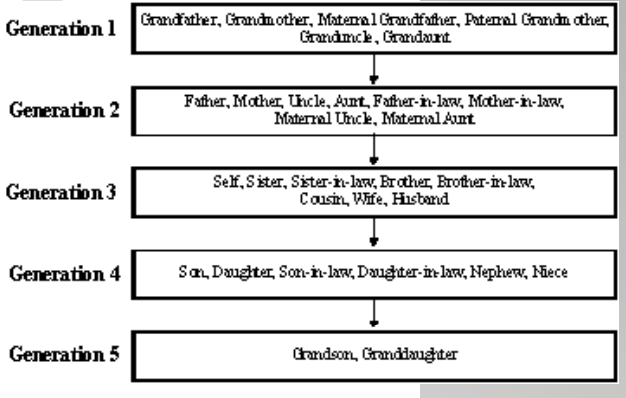
2. Relations of Maternal side:

- Mother's father → Maternal grandfather
- Mother's mother → Maternal grandmother
- Mother's brother → Maternal uncle
- Mother's sister → Aunt
- Children of maternal uncle → Cousin
- Wife of maternal uncle → Maternal aunt

Example:

- My mother's or father's son is my Brother.
- My mother's or father's daughter is my Sister.
- My mother's or father's father is my Grandfather.
- My mother's or father's sister is my Aunt.
- My mother's or father's brother is my Uncle.
- My son's wife is my daughter- in - law.
- My daughter's husband is my Son - in - law.
- My brother's son is my Nephew.
- My brother's daughter is my Niece.
- My sister's husband is my brother - in - law.
- My brother's wife is my Sister - in - law.
- My husband's or wife's sister is my Sister- in-law.
- My husband's or Wife's brother is my Brother-in - law.
- My uncle's or aunt's son or daughter is my Cousin.
- My wife's father or husband's father is my Father-in-law.
- My wife's mother or husband's mother is my Mother -in - law.
- My father's wife is my Mother.
- My mother's husband is my Father.
- My son's or daughter's son is my Grandson.
- My son's or daughter's daughter is my Granddaughter.
- In these types of questions, a roundabout description is given in the form of certain small relationships and direct relationships between the persons concerned are to be deciphered.

Relations from one generation to next:



TYPE of QUESTIONS:

TYPE 1: Deciphering jumbled up descriptions

Example:1

Pointing out to a lady Deepti said, "She is the daughter of the woman who is the mother of the husband of my mother." Who is the lady to Deepti?

(a) Aunt (b) Cousin
(c) Sister (d) Mother

Solution:

The relationship may be analyzed in the following manner:

Husband of my mother → My Father

My Father's mother → My Grandmother

My Grandmother's Daughter → My Father's sister → My Aunt

The lady in the photograph is Deepti's Aunt.

Hence [a]

Example:2

How is Hema's mother's mother's daughter - in law's daughter related to Hema?

(a) Sister (b) Mother
(c) Cousin (d) Aunt

Solution:

Hema's mother's mother → Hema's (Maternal) grandmother

Hema's Grandmother's Daughter - in - law → Hema's (Maternal) Aunt

Hema's Aunt's daughter → Hema's Cousin

Hence [c]

Example:3

Pointing towards a lady in a photograph, a girl said, "She is the sister of my mother's husband". How is the girl related to the lady?

(a) Daughter (b) Niece
(c) Sister (d) Daughter or niece

Solution:

My Mother's husband → My Father

My Father's sister → My Aunt

So the girl is niece of the lady.

Hence [b]

Example:4

Pointing to a photograph, a man said, I have no brother or sister but that man's father is my father's son. Whose photograph was it?

(a) His own (b) His sons
(c) His fathers (d) His nephews

Solution:

As the man has no brother or sisters, he is pointing to his son's photograph.

Hence [b]

Example:5

A woman while looking at the photograph of a man said, "He is the maternal grandfather of children of my husband's sister". How is the man related to the woman?

(a) Father (b) Father - in - law
(c) Grandfather (d) Brother - in - law

Solution:

Maternal Grandfather of children of My husband's sister → Father of my husband's sister → Father of my sister - in - law → My Father - in - law. Hence [b]

TYPE 2: Relation Puzzles

Example:

A is the widow of B. B and C were the only children of E. C is unmarried and is a doctor. D is the granddaughter of E and studies science. How is A related to D?

(a) Aunt (b) Daughter
(c) Sister (d) Sister - in - law

Solution: [b].

Now, try the following questions as it will give you good practice for yourself and at the same time, this can also be used as an assessment tool to understand where you stand right now.

1. A is B's mother's sister's daughter-in law's husband. Then, what is A's relation to B?
   (a) Brother (b) Uncle
   (c) Cousin (d) None of the above
2. A is B's father's wife's daughter's son. Then, what is A's relation to B?
   (a) Cousin (b) Nephew
   (c) Uncle (d) None of the above
3. While pointing towards a photograph Ramu said, "The man in photo is my father's father's daughter-in-law's son". Then, how is Ramu related to that person?
   (a) Brother (b) Uncle
   (c) Cousin (d) Cannot be determined
4. Ramu is Raju's sister's father's wife's father-in-law's father's only grandson's son. Then, what is Ramu's relation to Raju?
   (a) Father (b) Brother
   (c) Son (d) None of the above
5. Kallu said pointing towards a lady, "She is my daughter's husband's sister-in-law's mother". How is she related to Kallu?
   (a) Wife (b) Mother
   (c) Daughter (d) None of the above
6. A is B's father's only child's son's aunt. Then, what is A's relation to B?
   (a) Sister (b) Cousin
   (c) Niece (d) Mother
7. Tanush is Tanvi's mother's father-in-law's only granddaughter's brother. How is Tanvi related to Tanush?
   (a) Cousin (b) Niece
   (c) Sister (d) Mother
8. A is B's sister-in-law. B is C's only son. D is C's only daughter-in-law. Then, how is A related to D?
   (a) Sister (b) Sister-in-law
   (c) Mother-in-law (d) Mother
9. Ramu is Rani's sister's husband. Rani is Kallu's only

daughter-in-law's sister. Kallu is Hema's father-in-law. Then, how is Hema and Ramu related?
(a) Brother-in-law (b) Husband
(c) Brother (d) None of the above

10. A pointed towards a photo and said, "He is my sister's husband's father-in-law's only grandson's father". How is he related to A?
(a) Son (b) Uncle
(c) Father (d) Himself

11. Arvind is Ashish's mother's brother's daughter's brother. How is Arvind related to Ashish?
(a) Cousin (b) Brother
(c) Uncle (d) Nephew

12. Pointing towords a person in a photo, Ramu Said to a lady, "His mother is the only daughter of your father". How is the lady related to the person in photo.
(a) Wife (b) Mother
(c) Sisiter (d) Can't be determine

13. A is B's maternal grandparent's only son. How is A related to B?
(a) Father (b) Maternal Uncle
(c) Cousin (d) None of these

14. A is B's paternal uncle's sister's daughter. How is A related to B?
(a) Sister (b) Cousin
(c) Aunt (d) None of these

15. Ramu is Kallu's grandparent's daughter-in-law's son. Then, how is Kallu related to Ramu?
(a) Brother-in-law (b) Brother
(c)Cousin (d) Cannot be determined

16. Esha is Devesh's son's daughter-in-law's daughter. How is Devesh related to Esha?
(a) Father (b) Grand father
(c) Great grand father (d) None of these

Directions for questions 17-20: Fill in the blanks.

17. My daughter-in-law's husband's brother's son's grandfather's father is my _____ .
(a) Brother (b) Son
(c) Cousin (d) Father

18. My father's _____'s son's sister is my Aunt.
(a) Sister (b) Father
(c) Son (d) Grandfather

19. I am my grandfather's only child's daughter-in-law's___.
(a) Brother (b) Husband
(c) Brother-in-law (d) Either b or c

20. I am my brother's father's only niece's _____.
(a) Brother (b) Niece
(c) Cousin (d) Father

21. In a family, there are three fathers, three mothers, one grandfather, one grandmother, 5 sons and 1 daughter. At least how many members are there in the family?
(a) 8 (b) 9
(c) 10 (d) 11

22. If A is the brother of son of B's son, then how is B related to A?
(a) Grandson (b) Grandfather
(c) Father (d) Cousin

23. A is the son of B while B and C are sisters to one another. D is the father of C. If E is the daughter of D, then which of the following statements is correct?
(a) D is the father of A.
(b) E is the cousin of A.
(c) B and E are sisters.
(d) E is the mother of B and C.

24. Aman is the uncle of Ram, whose sister is married to Shyam whose father in law's only sibling's son is Ravi. How is Aman related to Ravi?
(a) Brother (b) Cousin
(c) Son (d) Father

Directions for questions 25 to 27: Read the following information and answer the questions that follow:

P is the father of Q. But Q is not the son of P.
R is the brother of Q. S is the daughter of R.
T is the daughter of Q. U is the spouse of P.
V is the spouse of R. W is the father of V.

25. Who is the grandmother of S?
(a) Q (b) V
(c) U (d) P

26. How is R related to W?
(a) Son (b) Father
(c) Son in law (d) Brother

27. How many daughters are there in this family?
(a) 2 (b) 3
(c) 4 (d) 5

28. A's father's only nephew's father's niece is B. Then how is B related to A?
(a) Sister (b) Mother
(c) Cousin (d) Cannot be determined

Directions for questions 29 to 32: Read the following information and answer the questions that follow:

Mr and Mrs Verma have two children Disha and Ravi. Ravi married Rani, daughter of Mrs Khanna. Sunny, son of Mr Khanna married Geeta. Monu and Tony are born to Sunny and Geeta. Reena and Veena are the daughters of Ravi and Rani.

29. What is Veena's relation to Disha?
(a) Sister (b) Niece
(c) Aunt (d) Daughter

30. How is Monu related to Mr Khanna?
(a) Son in law (b) Sibling
(c) Grandson (d) Cannot be determined

31. How is Disha related to Rani?
(a) Mother in law (b) Aunt
(c) Sister in law (d) Niece

32. How is Sunny related to Veena?

(a) Brother (b) Maternal Uncle
(c) Uncle (d) Cousin

33. Raju while pointing towards a lady said: "That lady is my uncle's only sister's daughter's only maternal aunt." How is that lady related to Raju?
(a) Mother (b) Sister
(c) Aunt (d) Cousin

34. A boy wrote on a letter to his relative: "To my dearest Father's younger brother's wife's only son's elder sister's only cousin brother's elder sister". Whom id the boy referring to?
(a) His cousin (b) His mother
(c) His sister (d) His aunt

35. In a family, there are 4 brothers, 5 sisters, 2 mothers, 2 fathers. Then, there must be atleast how many persons in the family?
(a) 12 (b) 11
(c) 10 (d) 9

Directions for questions 36 to 40: Read the following information carefully to answer these questions:

(i) 'A $ B' means 'A is mother of B'.
(ii) 'A # B' means 'A is father of B'.
(iii) 'A @ B' means 'A is brother of B'.
(iv) 'A % B' means 'A is sister of B'.
(v) 'A ^ B' means 'A is husband of B'.
(vi) 'A & B' means 'A is son of B'.

36. P & Q @ R % S $ T indicates that P is related to T as?
(a) Brother (b) Father
(c) Neice (d) Cousin

37. P $ Q # R % S @ T indicates that P is related to T as?
(a) Mother (b) Grandmother
(c) Aunt (d) Sister

38. P & Q ^ R % S # T indicates that P is related to T as?
(a) Grandson (b) Father
(c) Son (d) Cousin

39. Which of the following indicates that Z is the brother of N?
(a) N # R $ P $ Z (b) Z @ R # P $ N
(c) Z @ S % R @ N (d) Z # Q @ P ^ X % N

40. If C $ G @ H, how is C related to H?
(a) Daughter in law (b) Mother
(c) Daughter (d) Aunt

41. When Ramu saw Kallu, he recalled, "He is the only son of my father's brother's wife's father in law's parents. How is Ramu related to Kallu?
(a) Grandchild (b) Parent
(c) Sibling (d) Cousin

Direction for questions 42 to 44: Read the given information and answer the question that follow:

Mr Venkat has three children - Sankat, Richa and Sammy. Sammy is married to Richa's friend Ruchi. Richa is married to Ruchi's brother. Sankat's brother in law's wife's sister in law's name is Seeta. Seeta has two sons - Ajay and Amit and Richa has two daughters - Ragini and Rani.

42. What is Ruchi's relation with Ragini?
(a) Maternal Aunt (b) Aunt
(c) Cousin (d) Either (a) or (b)

43. What is Seeta's relation to Mr. Venkat ?
(a) Daughter's friend (b) Daughter in law
(c) Grand daughter (d) Cannot be determined

44. How many pairs of brother sisters are there in the family?
(a) 2 (b) 3
(c) 4 (d) 5

45. If Ramu's daughter marries Ram's only son. Then, what will Ramu's son call Ram's only grandson?
(a) Brother in law (b) Brother
(c) Cousin (d) Nephew

46. A's brother's wife's son's elder sister's grandfather's only daughter's son is B. Then A is B's _____.
(a) Sibling (b) Father
(c) Mother (d) Cousin

47. In a particular planet, Sister means mother, brother means father, father means son, mother means daughter, son means brother and daughter means sister. Ramu and his family lives there and Ramu calls Rani as his brother's father's daughter's sister. Then actually Ramu is Rani's _____.
(a) Son (b) Nephew
(c) Brother (d) Father

48. As per previous question, if Ramu calls Kallu as 'his father's brother's son. Then Ramu is Kallu's _____.
(a) Father (b) Cousin
(c) Nephew (d) Brother

49. Amrin's father's only daughter's father in law's only grandson's sister is Amrin's _____.
(a) Sister (b) Sister in law
(c) Daughter (d) Cannot be determined

50. If Rajesh's brother marries Rani's father's grandson's only aunt. Then, how will Rajesh related to Rani?
(a) Brother in law (b) Cousin
(c) Nephew (d) Cannot be determined

■■■■

2 CODING AND DECODING

Coding decoding is one more popular segment of reasoning section of many aptitude tests ranging from the easiest possible aptitude tests to the toughest possible aptitude tests. These questions are a good test of your out of the box thinking and your ability to relate numbers with alphabets and vice versa. These questions basically test ability of an aspirant to understand the patterns and extrapolate or interpolate the same.

As per the conventional patterns, there are generally alphabets broken down into numbers and then these numbers are arranged in one way or the other to get some codes. One needs to remember the complete alphabet series to solve such questions. One can also use the alphabet series in form of "EJOTY" which is formed by 5^{th}, 10^{th}, 15^{th}, 20^{th} and 25^{th} alphabets of the alphabet list. At the same time, there are many a questions which require us to count the alphabets in the reverse order also and thus it makes lot more sense to be quick in counting backward. One common mistake that many of us tend to commit in these questions is about counting back, when they simply subtract the rank of the number from 26 considering there are only 26 alphabets in the series. For example: if A is the first, then it is not 25th alphabet from the back, rather it is 26th alphabet from the back. So if there is an alphabet which is x^{th} from the beginning then its rank from back will be $(26-x+1)^{th}$ rank from the back.

While solving such a question, a perfect approach will be firstly write down the rank of all the alphabets of the numbers and all the ranks of the alphabets of the code and then one should try to find a link between these numbers and then the questions can be easily solved.

Now, try to solve the following questions on the basis of the knowledge that you have gained from this article along with your prior experiences

1. If "RAJU" is coded as "SCMY", then what will be code of "KALLU"?
   (a) LCOPZ (b) LCOOZ
   (c) LCOOY (d) LCPOZ

2. If "KAPIL" is coded as "PZKRO", then what will be the code of "SEHWAG"?
   (a) EVSDZT (b) HVSDZT
   (c) TVSDZH (d) DZTHVS

3. If "DEVESH" is coded as "SHVEVW", then what will be code of "MANOJ"?
   (a) NZMLQ (b) QLNZM
   (c) QLMZN (d) QLZMN

4. If "VIDHI" is coded as "IHDIV", then what will be code for "SUSHIL"?
   (a) USHSLI (b) LISHUS
   (c) LIHSUS (d) None of the above

5. If code for "NAMAN" is "MZLZM", then what will be the code for "PARTHIV"?
   (a) OZRSGHU (b) OZQSGHU
   (c) OZRTGUV (d) OZRTSUV

6. If "RAMAN" is coded as "QYJWI", then what will be the code for "CHAMAN"?
   (a) BFXIVH (b) BFYJWI
   (c) BGYJWI (d) BGXIVH

7. If "BANGLADESH" is coded as "ABGNALEDHS", then what will be code of "SRILANKA"?
   (a) RSILNAAK (b) RSLIANAK
   (c) RSNALIAK (d) RSLINAAK

8. If "INDIA" is coded as "NIDAI", then what will be code of "NADIA"?
   (a) ANEAI (b) ANDIA
   (c) ANDAI (d) NADAI

9. If "CHROICLE" is coded as "DGSNJBMD", then what will be the code for "CAMPUS"?
   (a) DZNOVR (b) DBLQTT
   (c) AZNUTR (d) CZNUTR

10. If "MEHUL" is coded as "OFSVN", then what will be the code for "SMITA"?
    (a) ZNGRH (b) ZNGNH
    (c) ZGNRH (d) ZGRNH

11. If "LALLU" is coded as 58 then what will be code for "KALLU"?
    (a) 56 (b) 57
    (c) 59 (d) 60

12. If "ZOOZLE" is coded as "05-12-26-15-15-26", then what will be the code for "GOOGLE"?
    (a) 5-12-7-15-15-7 (b) 05-12-07-15-15-07
    (c) 05-12-08-15-15-08 (d) 05-12-06-15-15-06

13. If "SUNIL" is coded as "8:6:13:18:15", then what will be the code of "VAIBHAV"?
    (a) 4:25:17:24:18:25:4 (b) 4:26:18:25:19:26:4
    (c) 5:25:17:24:18:25:4 (d) 5:26:18:25:19:26:5

14. If "KARIM" is coded as "1200190814", then what will be code of "LANGRA"?
    (a) 130015061900 (b) 120014061800
    (c) 110013061700 (d) 130016061900

15. If "RAAM" is coded as 30 and "RAHIM" is coded as 47, then what will be the code for "CRIST"
    (a) 94 (b) 64
    (c) 54 (d) 74

16. "GOD IS GREAT" is coded as "SA RE MA" and

"LOVE IS GOD" is coded as "RE GA MA" and "GOD LOVE YOU" is coded as "RE GA PA". Which of the following can be code for ""I LOVE YOU"
(a) SA GA PA (b) NI GA PA
(c) NI MA PA (d) SA GA NI

17. If "CAMPUS IS BEST" is coded as "12 13 14", "CAMPUS LIFE" is coded as "11 12", then which of the following can be the code of "LIFE IS GOOD"?
(a) 11 13 15 (b) 11 15 14
(c) Neither (a) nor (b) (d) Either (a) or (b)

18. If "I And You" is coded as "*&^" and "I Hate You" is coded as "&^%" and "I Go" is coded as "^#", then which of the following can be the code for "You Go I Come"?
(a) ^&@$ (b) *^&#
(c) ^&#@ (d) Either (b) or (c)

19. If "MANOJ" is coded as "41561", then what will be code for "DEVESH"?
(a) 454518 (b) 456518
(c) 455528 (d) 455518

20. If "pan van lan jan" means "will you go there", "dan lan tan man" means "you better come here", "ban can nan jan" means "this will not do", "wan van can yan" means "please do sit there", Then what is the code word for "go"?
(a) van (b) pan
(c) lan (d) jan

21. Which should be the fifth letter to the right of 16th letter from the right if second half of the alphabets are reversed?
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) Z (b) Y
(c) X (d) W

22. In a class all the boys and girls are made to stand in a row such that one boy is standing behind first girl, two boys are standing behind second girl, three boys are standing behind third girl respectively. Total number of girls in the class is 10. All of them are facing North. Who is standing (boy or girl) to 7th to the left of the one who is standing 30th from the right and what is his position from the left, If P first girl is slanding at left most position?
(a) Girl, 26 (b) Boy, 28
(c) Girl, 28 (d) Boy, 27

23. In the following series how many O's are there which are immediately preceded by 'Q or O' but not followed by O.
QOQQOQOQOOOQQOQOQOOQQOQOQOOO
QOQOQQOQOQOQOQQOOQOQOQOOQOQO
(a) 18 (b) 20
(c) 22 (d) 23

24. In a certain language 'apj' means 'go to school'; 'tpr' means 'want to stay'; 'adt' means 'go or stay'; 'wds' means 'eat or play', then what could be the indication for 'play to stay'.
(a) tpa (b) tsw
(c) pwj (d) pst

25. Seven players of a group are selected to play from Sunday to Saturday on different days. Rajan plays on Tuesday, Sajan plays two days after him who plays before Diwakar, Baman plays after Sunny but he plays two days before Naman. Raman plays two days after Sunny then on which day Raman and Baman plays?
(a) Monday & Thursday
(b) Monday & Saturday
(c) Wednesday & Monday
(d) Thursday & Monday

26. In a certain code a means ÷, b means -, c means x, d means + then the value of 32c4d14a7b10?
(a) 120 (b) 126
(c) 62 (d) 60

27. If REDDY is coded as DERYD then how will LIGHT be coded ?
(a) ILHTG (b) GLIHT
(c) GILTH (d) THGIL

28. If RING is coded SHMH, then what is the code for PONG?
(a) QPOH (b) QNOH
(c) QNMH (d) QMNH

29. If AMERICA is coded "BOHVNIH" then what will be the code for "RUSSIA"?
(a) VUUVMF (b) SWVWNG
(c) SWVVMF (d) SVWXNG

30. If 'zing zang zong' is code for 'where are you' and 'zang tong pong' is code for 'where am I' and 'zing tong pong' is code for 'am I you', then what is the code for 'I'?
(a) tong (b) pong
(c) zing (d) either a or b

Directions for 31 to 35: The code for a word is given, then find the code for the given word in the same manner:
MASSACHUSETTS : SAMCASSUHTTES

31. CALIFORNIAS :
(a) LACIOFNRIAS (b) LACOIRNFAI
(c) SCILOFNRAIS (d) LACOFIINRA

32. AMSTERDAM :
(a) SAMRETMAD (b) SMARETMDA
(c) SMARETMAD (d) SMAERTAMD

33. TYPESETTINGS :
(a) EPYTTTESGNIS (b) PYTESEITTSGN
(c) PYESEETITGNS (d) PYTESETITNGS

34. VENEZUELA :
(a) NEVUEZALE (b) NEVUZEELA
(c) NEVUZEALE (d) EVENUZLEA

35. MOROCCOAMADINAN :
(a) ROMOCOCAMANADIN
(b) ROMCCOMAOIDAANN
(c) ROMCCOMAOIDANAN

(d) OMORCCMAOIDANAN

Directions for questions 36 to 40: Find the word/number/alphabets with the same relation as in the given pair:

36. TEA : ZVG : : DOG :
(a) WLT (b) JBM
(c) SLV (d) JCM

37. SUMMER : REMMUS : : WINTER :
(a) NIWRET (b) RETWIN
(c) RETNIW (d) RTEINW

38. 24 : 36 : : 23 :
(a) 37 (b) 42
(c) 25 (d) 15

39. 12234 : 12 : : 98765 :
(a) 97 (b) 35
(c) 34 (d) 65

40. A : N : : M :
(a) B (b) O
(c) Y (d) Z

Directions for questions 41 to 45: The following codes are given. Answer the question using the codes given:

- '@' is the code for addition.
- '$' is the code for subtraction.
- '%' is the code for multiplication.
- '&' is the code for division.

41. What will be the result of 41 @ 24 & 6 % 5 $ 4?
(a) 57 (b) 25
(c) 30 (d) 32

42. Which of the following will result in 20?
(a) 400 @ 30 % 10 $ 5 & 2
(b) 400 & 10 $ 10 @ 5 % 2
(c) 400 % 30 $ 10 @ 5 & 2
(d) 400 & 30 % 10 @ 5 $ 2

43. Which among the following are correct?
(a) 20 @ 30 $ 10 % 10 & 5 = 20
(b). 30 % 4 & 12 @ 5 $ 2 = 10
(c) 45 & 9 @ 30 % 1 $ 5 = 30
(d) 60 $ 30 @ 20 % 2 & 2 = 20

44. Which among the following is incorrect?
(a) 200 &10 @ 20 $ 10 % 2 = 20
(b) 100 % 10 & 20 @ 15 $ 5 = 10
(c) 150 @ 50 $ 20 % 10 & 20 = 150
(d) 250 $ 100 @ 150 % 10 & 15 = 50

45. What will be the result of 140 $ 40 @ 100 & 10 % 5?
(a) 100 (b) 120
(c) 140 (d) 150

Directions for 46 to 50: Code the following words in the same way as the given word.

UNIQUE : FORSFH

46. STOLEN :
(a) GULFMP (b) HLUNUQ
(c) HUNPQS (d) VULSQN

47. FORBID :
(a) UPIDRG (b) UNIDRG
(c) UNIDRF (d) UPIDRF

48. AMERICA :
(a) ZNVTSFZ (b) ZNVTREZ
(c) ZNVTRFZ (d) ZNVTTFZ

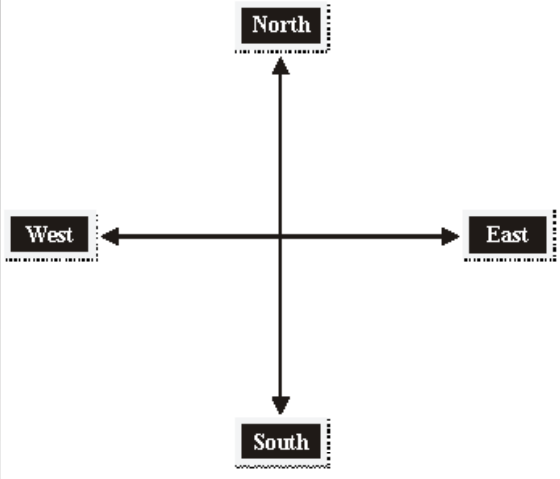
49. AMSTERDAM :
(a) ZNHVVUWEM (b) ZNHVVUWEN
(c) ZNHVVUWDM (d) ZNHVVUWDN

50. PHONE :
(a) KILPV (b) KILOU
(c) KILNV (d) KILNU

■■■■

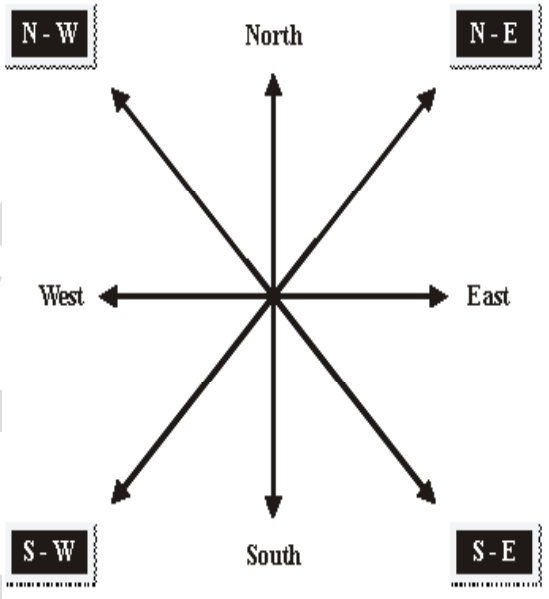
3 DIRECTION SENSE

Question on direction sense are pretty simple and evaluate a person's ability to visualize the situation and his understanding of different directions. The following picture



If we remember map of India, which we used to study during our childhood then it can be easily remembered. We all know that Kerala lies in the south of India and in Indian map it lies at the bottom. Similarly, Maharashtra and Gujarat are in west of India, West Bengal is east and Kashmir is in North of India and thus these directions can be easily remembered.

There are some more directions which one should know. These directions are nothing but combination of the initial set of directions. These directions are as follows:



Now a typical question on direction sense starts with some person going in certain direction and then taking certain right and left turns and finally reaching an end point. Now initial direction can either be given straight forward or through some leads. These leads are generally based on the direction of sun. As we all know that sun rises in the east and thus a person will have a shadow in the west during morning hours. And the same conditions get inversed in the evening. So, such a lead can be provided for initial direction of the person and then all things can be found out one by one.

The best way to master these questions is to draw the predicted path of the person and then keep on tracking each and every thing and final direction of the person can be predicted. Try to solve the following problems to understand these questions in a better way.

Each of the following questions 1-3 is based on the following information:

A # B means B is 5m to the right of A.
A $ B means B is 5m to the North of A.
A * B means B is 5m to the left of A.
A @ B means B is 5m to the South of A.

1. According to X @ B * Y, Y is in which direction with respect to X?
   (a) North (b) South
   (c) North-East (d) South-West

2. According to M # N $ T, T is in which direction with respect to M?

(a) North-West (b) North-East
(c) South-West (d) South-East

3 According to P # R $ A * U, in which direction is U with respect to P?
(a) East (b) West
(c) North (d) South

4. Some boys are sitting in three rows all facing North such that A is in the middle row. P is just to the right of A but in the same row. Q is just behind of P while R is in the North of A. In which direction of R is Q?
(a) South (b) south-west
(c) north-east (d) south-east

5. One morning, a couple - Raj and Simran - are sitting in a garden leaning on each other's back. Raj can see his shadow on his right. In which direction is Simran facing?
(a) East (b) West
(c) North (d) South

6. If south-east becomes north, north-east becomes west and so on, what will west become?
(a) South-west (b) North-east
(c) South-east (d) East

7. Rahul walks 5 km to the west direction. Then he takes a left and walks for another 10 km/s. Now he takes a right turn and walks 5 km. Which direction is Rahul facing and how far is he from the starting point?
(a) East; $10\sqrt{2}$ (b) West; $10\sqrt{2}$
(c) South; 0 (d) North; 0

Directions for questions 8 and 9: One fine morning Akhlas decided to go for jogging in the morning. He starts jogging in the direction of the rising of the sun for 10 min. He then turns left and jogs for next 10 min, after this he turns right and jogs again for 10 min. He is now tired and wanted to return back home. He had jogged throughout with a constant speed of 6 km/hr. Akhlas was totally lost and wanted to find out

8. In which direction was he from the house?
(a) North-east (b) South-east
(c) North-west (d) South-west

9. How far is he now from his home?
(a) $\sqrt{10}kms.$ (b) $\sqrt{5}kms.$
(c) 3 kms. (d) 1 km.

10. One fine morning Seeta and Geeta were talking to each other face to face. If Geeta's shadow was exactly to the left of Seeta, which direction was Seeta facing?
(a) East (b) West
(c) North (d) South

11. A man is facing towards East and turns through 45° clockwise, again 90° clockwise and then turns through 180° anti clockwise. In which direction is he facing now?
(a) East (b) North-west
(c) North-east (d) South-east

12. A river flows north to south and on the way turns right and goes in a semi-circle round a hillock, and then turns left at right angles. In which direction is the river finally flowing?
(a) East (b) North
(c) West (d) South

13. Ram is standing at the centre of a circular field. He goes down south to the edge of the field and then turns right and walk along the boundary of the field equal to five-eighths of its length. Then he turns right and goes right across to the opposite point on the boundary. In which direction is he from the starting point?
(a) North-west (b) North
(c) South-west (d) West

14. Shyam starts walking straight towards east. After walking 100 metres, he turns to the right and walks 50 metres backwards. Again he turns to the left, walks a distance of 60 metres straight, then he turns to the right and walks a distance of 50 metres. How far is he from the starting point?
(a) 100 metres (b) 160 metres
(c) 220 metres (d) 120 metres

15. Ranjan walks a distance of 5 km towards East, then turns to his right and walks for 4 km. He then turns left and walks for 4 km. At this point he turns to his right and walks for 2 km. He turns right and walks 1 km. How many kilometers is he from the starting point?
(a) 10 km (b) 9 km
(c) 8 km (d) 12 km

16. Namrata walks 20 metres towards East, then turns to her right and walks 20 metres and then turns to her right and walks 15 metres. Then turning to her right she walks 10 metres. What is the shortest distance (in metres) between her starting point and the present position?
(a) 10 (b) 5
(c) $\sqrt{5}$ (d) $5\sqrt{5}$

17. Sheena moves towards North a distance of 10 km and then she moves towards West and travels a distance of 15 km. From there, she moves towards South a distance of 5 km and finally she moves a distance of 15 km towards East and stood at that point. How far is the starting point from where she stood?
(a) 15 km (b) 8 km
(c) 5 km (d) 10 km

18. Hari starts from his house towards East. After walking a distance of 200 metres, he turned towards right and walked 150 metres. He then turned left and covered a distance of 100 metres, then turned towards his left and walked 300 metres. He then turns to the right and walks 150 metres. Finally he turns to his left. In which direction is he facing now?
(a) East (b) West
(c) North (d) South

19. Rani starts at point A, walks straight to point B which is 6 m away. She turns left and walks to point C which is 8 m away, turns right and goes 5 m to point D, turns left and walks 2 m to E, turns right goes to F,

which is 4 m away and once again turns right and goes to G which is 10 m away. What is the distance between A and G?
(a) 10 m (b) 15 m
(c) 12 m (d) 18 m

20. A farmer went to meet his friend in another village situated $5\sqrt{2}$ km away in the South-east direction of his own village. From there he came to meet his uncle living in a village situated 5 km in the west of his friend's village. How far away and in what direction is he now?
(a) 6 km in the North (b) 5 km in the North
(c) 4 km in the South (d) 5 km in the South

21. Madhav starts from his home and travels 4 km towards east and then turns left and travels thrice that distance. He again turns left and travels five times the distance he covered from his home till the first turn. The shortest distance between the starting point and the destination is:
(a) 12 km (b) 15 km
(c) 20 km (d) 18 km

22. Shubham walks 10 metres towards the South. Turning to the left, he walks 20 metres and then moves to his right. After moving a distance of 20 metres, he turns to the right and walks 20 m. How far and in which direction is he from the starting point?
(a) 10 metres North (b) 20 metres South
(c) 20 metres North (d) 30 metres South

23. A man walks 50 metres towards North. Then, turning to his left, he walks 50 metres. Then, turning to his right, he walks 40 metres. Again, he turns to his right and walks 50 metres. How far is he from his initial position?
(a) 50 metres (b) 90 metres
(c) 80 metres (d) 100 metres

24. Ishwar Chandra Chattopadhyay walked 250 metres towards East. Then he turned himself 90° in the clockwise direction and walked 200 metres. He then turned himself 180° in anticlockwise direction and walked 250 metres . Then he turned to his left and walked 250 metres. At what distance is he from the starting point and in which direction?
(a) 50 metres North (b) 250 metres South
(c) 300 metres South (d) None of these

25. Raghuvir walks northwards. After a while, he turns to his right and after sometime to his left. Finally, after walking a distance of 5 km, he turns to his left again. If its early sunrise, then on which side of him is the Sun shining?
(a) Front (b) Back
(c) Left (d) Right

26. Bhupendra travelled from a point X straight to Y at a distance of 100 metres. He turned right and walked 60 metres, then again turned right and walked 75 metres. Finally, he turned right and walked 60 metres. How far is he from the starting point?
(a) 10 metres (b) 25 metres
(c) 50 metres (d) 75 metres

27. Tinkoo went 12 kms to the North from his house. Then he turned left and covered 10 kms. Then he turned south and covered 8 kms. Finally, turning to East, he covered 6 kms. In which direction is he from his house?
(a) North (b) West
(c) North-West (d) South-East

28. Going 100 m to the South of point A, Rashmi turns left and goes another 40 m. Then, turning to the North, she goes 60 m and then starts walking towards point A. In which direction is she walking now?
(a) North-west (b) North-east
(c) South-west (d) East

29. Amit walks 250 metres in front and 250 metres to the left. Then every time turning to his right, he walks 50, 250 and 150 metres respectively . How far is he now from his starting point?
(a) 50 metres (b) 100 metres
(c) 150 metres (d) 200 metres

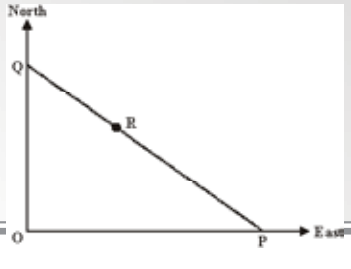
30. A boy is looking for his girlfriend. He went 100 metres in the East before turning to his right. He went 200 metres before turning to his right again to look for his girlfriend at his friends's 300 m from this point. His girlfriend was not there.From there he went 200 m to the North before meeting his girlfriend in a park. How far did the boy meet his girlfriend from the starting point?
(a) 180 metres (b) 100 metres
(c) 200 metres (d) 240 metres

31. Arjun's house faces the East. From the back side of his house, he walks straight 25 metres, then turns to the right and walks 15 metres. Finally, he turns towards left and stops after walking 5 metres. Now, Arjun is in which direction from the starting point?
(a) South-east (b) North-east
(c) South-west (d) North-west

32. Ramu and Kallu start moving towards each other from two places 2 km apart. After walking 600 m, Kallu turns left and goes 200 m, and then he turns right and goes 400 m. He then turns right again and comes back to the road on which he had started walking. If X and Y walk with the same speed, what is the distance between them now?
(a) 0 m (b) 100 m
(c) 200 m (d) 400 m

33. Of the five houses A, B, C, D and E situated close to each other, A is to the west of B, C is to the south of A, E is to the north of B and D is to the east of E. Then, D is in which direction with respect to C?
(a) East (b) South-east
(c) North-east (d) South-west

34. In the given figure, P is 40 m eastward of O and Q is 30 m north of O. R is exactly in the middle of Q and P. The distance between R and P is



(a) 25m (b) $25\sqrt{2}m$
(c) 12.5m (d) 50m

35. Five boys are standing in a row facing North. Raja is to the left of Ram, Mohan and Roy. Roy is between Ram and Mohan. Ram, Mohan and Roy are to the left of John. If Mohan is fourth from the left, how far is Roy from the right?
(a) Second (b) Third
(c) Fourth (d) Fifth

36. The bank is to the south of the hospital while stadium is to the east of the bank. The college is to the west of the hospital. If the distance of the college from the bank is equal to the distance of stadium from the hospital, in which direction is the college with respect to stadium?
(a) North-west (b) South-east
(c) North-east (d) South-west

37. Of the six students of a class sitting in a row, Armaan is to the left of Dhirendra, but on the right of Eshwar. Chanda is on the right of Sunanda, but is on the left of Bipasha who is to the left of Eshwar. Which student is sitting third from the right?
(a) Chanda (b) Bipasha
(c) Armaan (d) Eshwar

Directions for questions 38 to 40 : Study the information given below carefully and answer the questions that follow:

A, B, C, D, E, F, G, H and I are nine factories; C is 4 km east of B. G is 2 km west of H while D is 6 km east of G and F is 4 km north of G. A is 2 km north of B and H is 4 km south of A. I is situated just in middle of B and C while E is just in middle of H and D.

38. Distance between E and G is
(a) 10 km (b) 2 km
(c) 3 km (d) 4 km

39. Distance between E and I is
(a) 1 km (b) 2 km
(c) 3 km (d) 4 km

40. Distance between B and G is
(a) 1 km (b) 2 km
(c) 3 km (d) $2\sqrt{2}$ km

Direction for questions 41 and 42 : Study the information given below carefully and answer the questions that follow:

Five employees Arun, Varun, Samar, Vivek and Nishant are seated in a hall as described below facing the North.

Varun is 4 m to the right of Vivek.
Arun is 6 m to the south of Varun.
Samar is 2.5 m to the west of Vivek.
Nishant is 9 m to the north of Arun.

41. Who is to the north-east of the person who is to the left of Varun?
(a) Arun (b) Samar
(c) Either Samar or Arun (d) None of these

42. If the Boss walks from Samar, meets Vivek followed by Varun, and then Nishant, how many metres has he walked if he has travelled the straight distance all through?
(a) 8 m (b) 9 m
(c) 9.5 m (d) 10.5 m

Directions for questions 43 and 44 : these questions are based on the following information : Seven cities A, B, C, D, E, F and G are situated as follows:

A is 100 km to the west of F.
D is 400 km to the east of B.
C is 400 km to the South of A.
G is 400 km to the west of C.
B is 200 km to the north of E.
E is exactly in the middle of G and C.

43. Which city is to the south-west of City B?
(a) G (b) C
(c) A (d) F

44. If a man goes from city G to D via cities E and B, then what is the distance covered by that man?
(a) 200 km (b) 400 km
(c) 600 km (d) 800 km

45. Ramesh's car is facing North when he reaches his office. After starting from his house he turns right twice and then left before reaching the office. What direction was the car facing when he left from his home?
(a) East (b) West
(c) North (d) South

46. After walking 600 m, Arvind turned left and covered a distance of 200 m, then turned right and covered a distance of 1 km. After that he took two left turns two U turns and then a right turn. In the end, he was moving towards the West. From which direction did he start his journey?
(a) North (b) South
(c) East (d) West

47. A peon was returning to the school which was in front of him to the East. When the school was 200 metres away from him, he turned to the right and moved 100 metres to buy some chalks at a shop. He then moved in the same direction for 60 metres, turned to his left and moved 200 metres. How many metres was he away from the school?
(a) 0 (b) 60
(c) 160 (d) 100

48. If 'North-west' is called 'West', 'South-west' is called 'South', 'South-east' is called 'East', and so on, what will 'South' be called?
(a) East (b) South-west
(c) North-east (d) South-east

49. A direction pole was situated on the crossing. Due to an accident the pole turned in such a manner that the pointer which was showing North, started showing East. According to the pointer one traveler went to the south-west. In what direction actually he was travelling?
(a) North-east (b) South-east
(c) North-west (d) East

50. It is 9 O' clock in a watch. If the hour hand points towards the North-east then the minute hand will point towards the
(a) South (b) South-west
(c) North-west (d) South-east

4 ELIGIBILITY CRITERION

Questions on eligibility criterion generally appear in a set of five to ten questions and if one student can understand the complete data then probably solving these questions is just a cake walk. In the data given, there are certain pre-requisite criterions are provided which are required for a given position and anyone who possesses these qualities can be shortlisted for the position or admission. Let us understand these type of questions with the help of given example.

Refer to the data below and answer the questions that follow:

A marketing firm wants to recruit trainee officers. Following is the criteria for selection. The candidate must -

(i) Be a graduate in any discipline with at least 55% marks.
(ii) Have completed post-graduate degree/diploma in marketing management with at least 65% marks.
(iii) Have cleared the selection test with at least 50% marks.
(iv) Have cleared the interview with at least 55% marks.
(v) Be willing to sign a bond for 2 years.
(vi) Be not less than 21 years and not more than 26 years of age as on 1.3.2011.

However, if a candidate satisfies all the above criteria Except

(a) (ii), but has a working experience in the marketing department for at least one year and has a post-graduate degree/diploma with any specialization, the case is to be referred to the Vice-President.
(b) (v), but is willing to pay an amount of Rs. 1 lakh in case if the candidate leave the case is to be referred to the head of marketing department.

In each of the questions below, information of one candidate is given. You have to take one of the following five decisions based on the information provided and the criteria and conditions given above. You are not to assume anything other than the information provided in each question. All these cases are given to you as on 1.2 2011. You have to choose your decision or answers to each question as follows:

Mark answer:
(a) if the case is to be referred to Vice- President.
(b) if the case is to be referred to head of marketing Department.
(c) if the data is inadequate to take a decision.
(d) if the candidate is to be selected.
(e) if the candidate is not to be selected.

1. Sanjay Soni is an Arts Graduate passed with 58% marks. He has done MBA-HR with 64 marks in August 2004 and is working in the marketing department of a bank since January 2005. He has completed 24 years of age in November 2010. He is willing to sign the bond for 2 years. He has cleared the selection test with 58% marks and interview with 56% marks.

Solution:

Sanjay Soni satisfies all the criteria from (i) to (vi) except (ii). But he has more than one year experience in the marketing department of a bank and has a post graduate degree MBA-HR. So according to condition (a), the case is to be referred to the Vice-President. Hence our answer will be option (a).

2. Avinash Chavan is a Post Graduate in Management with specialization in Marketing, passed with 67% marks. He is working as a Jr. Officer in the Marketing Department of a private company. He is not willing to sign the bond but is willing to pay Rs. 1 lakh in case if he leaves. He has cleared the selection test with 52% marks and interview with 59% marks. His date of birth is 17.6.1986.

Solution:

As we don't know Avinash Chavan's percentage of marks of graduation, we cannot take a decision. Hence the correct answer will be option (c)

3. Sujay has passed B.E. with 67% marks and MBA Marketing with 69% mrks. He has scored 56% in selection test and 63% marks in interview. He has recently celebrated his 25th birthday on 17th September 2010. He does not want to sign a bond but is willing to pay Rs. 1 lakh if he leaves.

Solution:

Sujay satisfies all the criteria from (i) to (vi) except (v). But he is willing to pay Rs. 1 lakh if he leaves so according to (b) the case is to be referred to the head of marketing department. Hence, the right answer option will be option (b).

4. Rohan Bhalla is 24 years old Science Graduate passed with 58% marks and MBA in Marketing with 68% marks. He has secured 53% marks in selection test as well as in interview. He is willing to sign the bond for 2 years.

Solution:

Rohan bhalla does not satisfy criterion (iv), which is an essential criterion. So he is not to be selected. Hence the right answer option will be option (e).

5. Nandita sharma is a B.Com. Graduate passed in first class with 62% marks and has passed Post Graduate Diploma in Marketing Management with 72% marks. She has cleared the selection test and interview with 56% and 58% marks respectively. Her date of birth 21.12.1985. She is willing to sign the bond of 2 years.

Solution:

Nandita Sharma satisfies the entire criterion from (i) to (vi). So Nandita is to be selected. Hence the right answer option will be option (d).

6. Shrikant has passed B.A. with Economics with 59% marks and M.B.A. marketing with 69% marks. His date of birth is 16-07-1986. He has been working in the marketing department of a private firm Since Dec 2009. He has cleared the selection test with 56% marks and interview with 58% marks. He is willing to sign the bond for two years.

Solution:

As Shrikant satisfies all the criterion from (i) to (vi), he is to be selected. Hence the right answer option will be option (d).

7. Shymala is an II Engineering graduate passed with 67% marks. After working is an It company for two yrs. She has done postgraduate diploma in marketing management. His date birth is 16/4/85. She has recurred 53% marks in selection test and 56% marks in interview and is willing to sign the bond 2 yrs.

Solution:

As we do not know the percentage of marks in Post Graduation of Shymala and also work experience of Shymala is not in marketing department. So we cannot determine whether she is to be selected or not. Hence the right answer option will be option (c).

8. Rajan Sathe is a commerce graduate passed with 63% marks and has passed postgraduate diploma in marketing management with 12% marks. He has scored 58% & 62% in interview and selection test respectively. His date of birth is 16.2.1986. He is not willing to sign the bond but is willing to pay the amount of Rs.1 Lakh if he has to leave.

Solution:

Rajan Sathe does not have any work experience and his percentage of marks in PG is 12%. So Rajan is not to be selected. Hence the right answer option will be option (e).

9. Akhilesh malliya is an IT Engg. Passed first class with 66% marks at the age of 21 yrs in 2007 thereafter he as completed MBA finance in first class with 69% marks. He is working in the marketing department of an organization since Sept. 2006. He has cleared the selection test with 53% marks & interview with 56% marks. He is willing to sign the Bond for two yrs.

Solution:

Akhilesh Malliya satisfies all the criteria except (ii) but he has more than one year experience in marketing department. So his case is to be referred to the Vice-President. Hence the right answer option will be option (a).

10. Charanjit Singh is B.sc in zoology passed in first class with 63% marks and has passed postgraduate diploma in marketing management with 63% marks. He has secured 56%marks in interview. He is willing to sign the bond for two years.

Solution:

Charanjit Singh does not satisfy criterion (ii) and nothing is known about Criterion (iii). Hence he is not to be selected. Hence the right answer option will be option (e).

This was a typical set of eligibility criterion with different type of data that can be used to ask questions. Basically these questions are easy provided we have understood the data and comprehended and penned the complete data. In case, we have not penned down the complete data, it may take much more time to solve the questions we will have to look for the entire data again and again after each and every question.

After checking this particular set, you might have understood that these questions are not tough although at times, it might seem to be time consuming and frustrating. But with some good amount of practice, we will realize that these questions can be easily solved.

Now, practice the following questions, as it will give you more confidence for the same type of questions.

Directions for questions 1 to 5: Refer to the data below and answer the questions that follow:

Chronicle Publications Private Limited wants to recruit some writers for their content work at their head office. Following are the requirements of the same post.

(i) Candidate should have graduated in English literature with at least 55 % marks in graduation.

(ii) Candidate should not be less than 30 years of age as on 1st January 2011.

(iii) Candidate need to go through a written test and he/she should score at least 70 % marks in the test.

(iv) Candidate must clear the personal interview with at least 65 % marks

However, if a candidate satisfies all the above criteria except

A. (i), but has a appeared in IAS exams and have cleared first phase, then the case will be referred to Chair man of the company

B. (iii), but has scored more than 60 % marks in written test and is willing to pay an amount of Rs. 1 lakh in case if the candidate leave before 12 months of his job then the case is to be referred to Academic Head of Chronicle Publication.

In each of the questions below, information of one candidate is given. You have to take one of the following five decisions based on the information provided and the criteria and conditions given above. You are not to assume anything other than the information provided in each question. All these cases are given to you as on 1st of March, 2011. You have to choose your decision or answers to each question as follows:

Mark answer:

(a) if the candidate is to be selected.
(b) if the candidate is to be rejected.
(c) if the case is to be referred to Chairman of the company.
(d) if the case is to be referred to Academic Head of Chronicle Publication.
(e) if the data is inadequate to take a decision.

1. Chaman is a young and enthusiastic person. He is 31 years old and has completed his graduation in 2007 in English literature with 67 % marks. In the written test, he has scored 73% marks and he has scored 64 % marks in Personal Interview.

2. Raman has a good academic record along with a pleasant personality which was reflected in his interview and he topped the interview with 80 % marks. He has also taken the written test and scored 68 % in the same. Raman completed his graduation in 2001 at an age of 22 years in English literature with 63 % marks and he is working with a multinational company in marketing department.

3. Dharam is a veteran in content job and has worked with lots of companies at different levels. He has a great feedback when it come content job. He has scored 67% marks in his graduation which he completed in 2006 in English literature. In the written test, he has scored 72 % marks and he has scored 68% marks in interview.

4. Karam has been working with ABC ltd for last 5 years before which he completed his graduation as B Tech with 80% marks in year 2004 at an age of 24 years. From 2004 to 2006, he was preparing for IAS, where he cleared first two phases twice but could not finally convert the interview round. He has scored 72 % marks in interview and 72 % marks in written test as well.

5. Naram is a young energetic boy with graduation in English literature in year 2007 at an age of 28 years where he scored 58% marks. Currently, he is preparing for IAS but could not clear first phase in his last attempt. He scored 80 % marks in the written test 66% marks in interview.

Directions for questions 6 to 10: Refer to the data below and answer the questions that follow:

Admission process for admissions to a medical college was being conducted. Following are the pre-requisite for admission in the medical college.

(i) Student must have passed XII exams with biology as one of his/her subject.
(ii) Student must have scored 60 % marks in his class XII exams. In case of reserved category, student can be given a relaxation of 5% marks.
(iii) Student should have scored at least 55% marks in the entrance test. In case of reserved category, student can be given a relaxation of 5 % marks.
(iv) Student should have scored at least 50% marks in the personal interview. In case of reserved category, student can be given a relaxation of 5 % marks.
(v) In case of a reserved category, only one relaxation can be provided among (ii), (iii) and (iv).

However, if a candidate satisfies all the above criteria Except

A. (ii), but has scored more than 55% in class XII exams and more than 65% in entrance test then the case will be referred to program chair person.
B. (iii), but has score more than 45% marks in interview then the case will be referred to program coordinator.

In each of the questions below, information of one candidate is given. You have to take one of the following five decisions based on the information provided and the criteria and conditions given above. You are not to assume anything other than the information provided in each question. All these cases are given to you as on 1st of March, 2011. You have to choose your decision or answers to each question as follows:

Mark answer
(a) if the candidate is given the admission to the college.
(b) if the candidate is to be rejected.
(c) if the case is to be referred to program chair person.
(d) if the case is to be referred to program coordinator.
(e) if the data is inadequate to take a decision.

6. Chunnu is an academically strong boy and has cleared class XII with 72 % marks. He has scored more than 60 % marks in written test as well as personal interview.

7. Munnu did his class XII in year 2010 with 60 % marks with Biology as the main subject. He scored 53 % marks in personal interview as well as written test.

8. Mummu did her class XII in year 2010 with 75 % marks and she scored more than 90 % marks in biology, physics and Chemistry. She scored more than 60 % marks in personal interview as well as written test.

9. Tunnu, a reserved category student scored 58 % marks in his class XII with both Biology and Mathematics as two main subjects. Tunnu has scored 52 % marks in written test as well as personal interview.

10. Kunnu has completed his class XII exams this year with flying colours. He being a phenomenal student has scored more than 90% marks in all the subjects including Biology. He has scored 53 % marks in written test and 52% marks in personal interview.

Directions for questions 11 to 20: Study the following information carefully and answer the questions given below it.

Following are the conditions for admitting students to a Postgraduate Programme in Financial Analysis. The candidate must -

(i) Have secured at least 60 percent marks in standard XII.
(ii) Be a commerce graduate with at least 55 percent marks.
(iii) Have post qualification work experience of at least two years in an organization.
(iv) Have secured at least 45 percent marks in the entrance examination.
(v) Have secured at least 40 percent marks in the selection interview.
(vi) Be able to pay Rs. 2,00,000 towards annual fees at

the time of admission.

In the case of a candidate who has satisfied all the conditions Except -

(A) At (ii) above but has successfully completed Cost Accountancy or Chartered Accountancy, the case is to be referred to the Dean.

(B) At (vi) above but can pay at least Rs. 1,20,000 at the time of admission and the remaining amount within six months of admission, the case is to be referred to the Director.

In each question below details of one candidate are given. You have to take one of the following courses of action based on the information provided and the conditions and sub conditions given above and mark the number of that course of action as your answer. You are not to assume anything other than the information provided in each question. All these cases are given to you as on 01.02.2010.

Mark answer

(a) if the candidate is not to be admitted.

(b) if the candidate is to be admitted.

(c) if the case is to be referred to the Dean.

(d) if the case is to be referred to the Director.

(e) if the data provided are not adequate to take a decision.

11. Sohan Khera has secured 58 percent marks in B. Com. And 68 percent marks is standard XII. He can pay Rs. 2, 00,000 at the time of admission. He has also secured 50 percent marks in both the entrance examination and selection interview. He has been working in an organization for past three years after completing his graduation.

12. Sulekha Maitra has been working for the past four years after completing her graduation with 75 percent marks. She has secured 70 percent marks in standard XII. She has also secured 55 percent marks in both entrance examination and selection interview. She can pay Rs. 2,00,000 at the time of admission.

13. Anjan Srivastav has secured 70 percent marks in standard XII. He can pay Rs. 2,00,000 at the time of admission. He has secured 50 percent marks in B.Com. and has also successfully completed his Cost Accountancy course. He has secured 50 percent marks in the entrance examination and 40 percent marks in the selection interview. He has been working for the past two years after completing his Cost Accountancy course.

14. Abhinav Gupte has secured 55 percent marks in B.Com. and 65 percent marks in standard XII. He has been working for the past three years in an organization after completing his graduation. He can pay Rs. 1, 50,000 at the time of admission and the remaining amount within three months of admission. He has secured 45 percent marks in the entrance examination and in selection interview.

15. Suhas Rastogi has been working in an organization for the past four years after completing his B.Com. with 60 percent marks. He has also secured 40 percent marks in the entrance examination and 45 percent in the selection interview. He has secured 68 percent marks in standard XII. He can pay Rs. 2, 00,000 at the time of admission.

16. Neha Shukla has secured 65 percent marks in standard XII and 50 percent marks in both the entrance examination and selection interview. She has been working in an organization for the past three years. After completing her B.Com. with 54 percent marks. She can pay Rs. 2, 00,000 at the time of admission. She has no additional qualification.

17. Sudha Kapse has been working in an organization for the past three years after completing her B.Com. with 58 percent marks. She can pay Rs. 2, 00,000 at the time of admission. She has secured 45 percent marks in the entrance examination and 40 percent marks in the selection interview. She has secured 72 percent marks in standard XII.

18. Navin Ghosh has been working for the past two years in an organization after completing his B.Com. with 65 percent marks. He has secured 50 percent marks in the entrance examination and 45 percent in the selection interview. He can pay Rs. 2,00,000 at the time of admission.

19. Arun Jadhav has secured 68 percent marks in standard XII. He has been working in an organization for the past three years after successfully completing his Chartered Accountancy. He has secured 53 percent marks in B. Com. And 45 percent marks in both entrance examination and selection interview. He can pay Rs. 2, 00,000 at the time of admission.

20. Josheph Abraham has been working in an organization for the past four years after successfully completing his B.Com. with 60 percent marks. He can pay Rs. 1, 40,000 at the time of admission and the remaining amount within five months. He has secured 69 percent marks in standard XII. He has also secured 48 percent marks in the entrance examination and 42 percent marks in the selection interview.

Directions for questions 21 to 30: Study the following information carefully and answer the questions given below:

Following are the conditions for granting loan of Rs. 10 lacs to the farmers for purchasing tractor, by a Rural Bank.

The farmer must -

(i) Have at least five acres of cultivable land.

(ii) Be able to produce security of at least Rs. 8 lacs.

(iii) Not be more than 50 years old as on 1.1.2007.

(iv) Not have any outstanding unpaid loan from the bank

(v) Be able to produce a recommendation letter from the Village Head.

In the case of a farmer who satisfies all other criteria Except

(A) At (i) above, but is able to cultivate more than one crop in each piece of land, the case is to be referred to Chairman of the bank:

(B) At (iv) above, but has Fixed Deposits of at least Rs.

4 lacs with the bank, the case is to be referred to the General Manager to the bank.

In each question below, detailed information of one farmer is given, you have to carefully study the information provided in each case and take one of the following courses of actions based on the information and conditions given above. You are not to assume anything other than the information provided in each question. All these cases are given to you as 1.1.2007. You have to indicate your decision by marking answers to each question as follows:

Mark answer
(a) If the loan is not to be granted;
(b) If the case is to be referred to the General Manager of the bank;
(c) If the data provided is not adequate to take a decision;
(d) If the loan is to be granted;
(e) If the case is to be referred to the Chairman of the bank.

21. Manmeet Chaddha has obtained a recommendation letter from the Village Head. He has six acres of cultivable land and can produce security of Rs. 8 lacs. He was born on 30th December, 1956. He doesn't have any outstanding loan from the bank.

22. Bhavesh Kumar was born on 24th December, 1958. He can produce a recommendation letter from the Village Head. He has three acres of cultivable land with two crops in each piece of land. He can assure Rs. 8 lacs as guarantee. He has no outstanding loan from the bank.

23. Sujeet Sinha was born on 8th May, 1958. He can produce a recommendation letter from the Village Head. He does not have any outstanding loan. He has a fixed deposit of Rs. 6 lacs in addition to his to his security of Rs. 8 lacs. He has four acres of cultivable land with only one crop.

24. Manmohan Kumar was born on 23rd February, 1958. He has seven acres of cultivable land. He has submitted a recommendation letter issued by the Village Head. He can pledge security of more than Rs. 8 lacs. He doesn't have any unpaid loan from the bank.

25. Kumar Biswas was born on 13th August, 1962. He has four acres of cultivable land. He can produce a recommendation letter issued by the Village Head. He can give security of Rs. 9 lacs and does not have any outstanding loan from the bank. He grows two crops in each piece of his land.

26. Sandeep Mishra was born on 25th June, 1960. He has obtained a recommendation letter from the Village Head. He has ten acres of cultivable land and can pledge security of Rs. 8 lacs in addition to his fixed deposit of Rs. 6 lacs. He has an outstanding loan of Rs. 5 lacs.

27. Saurav Ganguly can produce a recommendation letter from the Village Head. He can produce security of Rs. 8 lacs in addition to his fixed deposit of Rs. 6 lacs. He has an outstanding loan of Rs. 2 lacs.

28. Abhijeet Kakkar has six acres of cultivated land. He has obtained a recommendation letter from the Village Head. He doesn't have any unpaid loan from the bank He grows two crops in his entire land. He can produce security of more than Rs. 7 lacs.

29. Somu Shukla was born on 15th June, 1958. He has twelve acres of cultivable land. He can produce a recommendation letter from the Village Head. He can give security of more than Rs. 10 lacs. He grows two crops on half of his total land.

30. Harsh Gupta has six acres of cultivable land and he doesn't have any outstanding loan from the bank. He can produce a recommendation letter from the Village Head. He can produce security of Rs. 9 lacs. He was born on 29th October, 1957.

Directions for questions 31 to 40: A college is to select meritorious graduate students for awarding scholarships for higher education who fulfill the following criteria:

(i) Age - More than 20 years but less than 25 years, as on 1 - Aug - 2009
(ii) Minimum percentage of marks - B.Sc. 60% or B.A. 50% or B.Com 55%
(iii) Prizes/Awards - Should have won at least one either in Essay, Debate or Sports.
(iv) Annual family Income - Not to be more than Rs. 1,00,000.
(v) Domicile - Must be staying in India for the last 15 years or above, as on 01 - 08 - 2009.

<u>Concessions:</u> One has to fulfill the above conditions. However, certain concessions are availaivle to the following categories:

(A) Wards of farmers (F) - Relaxation in the maximum age limit upto 5 years.
(B) SC/ST applicants (S) - Relaxation in percentage of marks upto 5%.

<u>Consideration:</u>

(C) Not fulfilling criterion (iii) above - the case may be referred to the Secretary of the College.
(D) Not fulfilling criterion (iv) above - the case may be referred to the Chairman of the College.

You have to study the information provided for a candidate in each of the following questions and decide the course of action.

Give answer:
(a) If the candidate is to be selected;
(b) If the candidate is to be selected under any concession;
(c) If the case is to be referred to the Secretary;
(d) In the case is to be referred to the Chairman;
(e) If the candidate is not to be selected.

Note: The candidate is to be considered 'Not to be Selected", if any required information regarding criteria (i) to (v) is not provided.

31. Rani was born on 02-08-1989 and recently passed B.Sc. with 66% marks. Her father is a teacher at a

Primary school at Allahabad since 1988 and has an annual family income of Rs. 88,000. She won a second prize in the State Athletic Championship.

32. 27-year old Neha has been staying with her father a Ramgarh village in Uttar Pradesh, since her birth, Her father, a farmer, has an annual income of Rs. 87,000. She obtained 63% marks in B.Com and had won a prize in College Football Competition.

33. Rama, the son of a farmer who has been staying in Bihar for the last four decades, passed B.A with 54% marks. He had got a first prize in the district-level boxing championship. His date of birth is 17-08-1986 and his father's annual income is Rs. 72,000.

34. Zakir, son of a taxi driver in Dubai, came to India with his family in 1978 and since then settled at Chandigarh. He got the first prize in College Debate Competition. He is a graduate in Science with 67% marks. His annual family income is Rs. 92,000.

35. Shanti, who will be 24 years old on 1-4-2009, passed B.Com. with 54% marks. Her father, a Government employee, has been working at Varanasi since 1987 whose present monthly salary is Rs. 8200. Shanti got the 2nd prize in the State Debate Competition.

36. Family of 24-year old Arun is settled at Cochin since 1975. He has 64% marks in B.Com. and had won a gold medal in the All India Club for Essay Competitions. His father, a farmer, has an annual income of Rs. 64,000.

37. From a poor scheduled tribe family living near Bhopal since 1959, 23-year old Harshit got his B.Com. degree with 52% marks. His father, a school teacher and sole earner in the family has a monthly income of Rs. 4,200. Harshit won the first prize in a district-level debate competition.

38. Born on 12-06-1990, Sheena completed her B.Sc. in May 2008. Her father is a farmer settled in Orrisa for the last 30 years. She is State Champion in Kabaddi. Her family's annual income is Rs. 97,000.

39. 24-year old Tulika has 75% in B.Com and had won the first prize in her final year Essay Competition. Her annual family income is about Rs. 1.20 lacs. Her father is settled in Punjab for the last 27 years.

40. 21-year old Dhanajay has 59% marks in B.Com and had bagged the first prize in All India Music Competition. His father, a tailor and sole earner in the family, has a monthly income of Rs. 6,400 and is settled in Shirdi since 1954.

Directions for questions 41 to 50: Study the following information carefully and answer the questions given below:

Following are the condition for selecting Assistant General Managers in an organization:

The candidate must-

(A) Be a graduate in any subject with at least 70% marks.

(B) Be at least 25 years and not more than 35 years old as on 1.6.2010.

(C) Have post-qualification work experience of at least five years in the Management department in an organization.

(D) Have obtained post-graduate degree/diploma in management with at least 60% marks.

(E) Have secured at least 60% marks in interview.

In the case of a candidate who satisfies all the criteria Except -

(i) At (A) above, but has secured at least 70% marks in post-graduate degree diploma in management, his/her case is to be referred to General Manager.

(ii) At (C) above but has post-qualification work experience of at least three years as Assistant Manager in an organization, his/her case is to be referred to CEO.

In each of the questions below is given the detailed information of one candidate. You have to take one of the following courses of action based on the information provided in each case and conditions and sub-conditions given above. You are not to assume anything other than the information provided in each question. All these causes are given to you as on 1.6.2010.

Mark answer

(a) If the candidate is to be selected;

(b) If the candidate is not to be selected;

(c) If the data provided are not adequate to arrive at a decision;

(d) If the case is to be referred to General Manager.

(e) If the case is to be referred to CEO.

41. Renu Shukla has secured 55% marks in graduation and 60% marks in interview. She has been working in the management department of an organization after obtaining her post-graduate degree in management with 72% marks. She was born on 24th October, 1978.

42. Vikas Malhotra has been working as Assistant General Manager in an organization for the past three years after completing his post-graduate diploma in management with 75% marks. He has secured 65% marks in graduation and 70% marks in interview.

43. Radhika Verma has secured 80% marks in graduation. She was born on 23rd July, 1976. She has been working as Assistant Manager for the past four years in an organization after completing her post-graduate degree with 63% marks. He has secured 64% marks in interview.

44. Rajan Jaiswal was born on 25th April, 1978. He has secured 65% marks in interview. He has been working for the past five years in the Management department of an organization and he has secured 60% marks in the post-graduate degree in management. He has also secured 65% marks in graduation.

45. Varun Gupta was born on 14th October, 1975. He has been working in the Management department of an organization for the past six years after obtaining his post-graduate degree in management with 63% marks. He has secured 55% marks in interview and

72% marks in graduation.

46. Akash Rastogi was born on 14th January, 1979. He has been working for the past eight years in the Management department of an organization after securing his post-graduate management degree with 69% marks. He has secured 65% marks in the interview.

47. Ajay Singhal has secured 60% marks in the interview. He has been working in the Management department of an organization for the past seven years after completing his post-graduate degree in management with 69% marks. He was born on 13th September, 1974. He has secured 65% marks in graduation.

48. Shubaham Agrawal has secured 65% marks in the interview. He has been working as the Asst. Manager of an organization for the past three years after completing his post-graduate diploma in management with 72% marks. He was born on 15th April, 1977. He has secured 70% marks in graduation.

49. Sanjay Singh was born on 10th February, 1979. He has secured 68% marks in graduation. He has been working for the past four years in the Management department in an organization after completing his post-graduate degree with 65% marks. He has secured 63% marks in interview.

50. Nivedita Bhattacharya has secured 85% marks in graduation. She has also secured 87% works in her post-graduate diploma in management. She has been working as Assistant Manager for the past three years in an organization after completing her post-graduate diploma. She has secured 66% marks in the interview. She was born on 19th August.

■■■■

5 INPUT AND OUTPUT

These type of questions are asked either in the form of alphabetical arrangement, machine arrangement or arrangement of numbers, etc. The main problem while solving Input - Output type of questions is that, no instructions are given about what to do with given letters, words, numbers or a combination of numbers and words. An example is generally given and one has to infer the instructions from the given example. The only way to get a complete command over this type of reasoning problems is to practice as much as you can.

Example 1:

An electronic device rearranges numbers step-by-step in a particular order according to a set of rules. The device stops when the final result is obtained. In this case the device stops at Step V.

Input: 85 16 36 04 19 97 63 09
Step I 97 85 16 36 04 19 63 09
Step II 97 85 63 16 36 04 19 09
Step III 97 85 63 36 16 04 19 09
Step IV 97 85 63 36 19 16 04 09
Step V 97 85 63 36 19 16 09 04

1. Which of the following will be Step III for the input below?
   Input: 09 25 16 30 32 18 17 06
   A. 32 09 25 16 30 18 17 06
   B. 32 30 09 25 16 19 17 06
   C. 32 30 09 25 16 18 17 06
   D. 32 30 25 09 16 18 17 06

2. What is last step for the input below?
   Input: 16 09 25 27 06 05
   A. Step II B. Step III
   C. Step IV D. None of the above

3. What is the output of Step V for the input below?
   Input: 25 08 35 11 88 67 23
   A. 88 67 35 25 23 11 08
   B. 88 67 35 25 23 08 11
   C. 08 11 23 25 35 67 88
   D. None of the above

4. Which one of the following would be last step for the input below?
   Input: 03 31 43 22 11 09
   A. Step II B. Step III
   C. Step IV D. None of the above

5. If the output of Step IV is as given below, what was the input?
   Step IV: 92 86 71 69 15 19 06 63 58
   A. 86 92 69 71 15 19 06 63 58
   B. 15 86 19 92 06 69 63 58 71
   C. 15 19 06 63 58 86 92 69 71
   D. None of the above

Solutions to Q. 1 to 5:

The rule here is that numbers are rearranged according to descending order. In one step only one number is arranged and remaining numbers are left in their order in the input. Now we can solve the above questions in the following manner:

1. Input: 09 25 16 30 32 18 17 06
   Step I: 32 09 25 16 30 18 17 06
   Step II: 32 30 09 25 16 18 17 06
   Step III: 32 30 25 09 16 18 17 06
   Hence [D]

2. Input: 16 09 25 27 06 05
   Step I: 27 16 09 25 06 05
   Step II: 27 25 16 09 06 05 (which is the last step)
   Hence [A]

3. Input: 25 08 35 11 88 67 23
   Step I: 88 25 08 35 11 67 23
   Step II: 88 67 25 08 35 11 23
   Step III: 88 67 35 25 08 11 23
   Step IV: 88 67 35 25 23 08 11
   Step V: 88 67 35 25 23 11 08
   Hence [A]

4. Input: 03 31 43 22 11 09
   Step I: 43 03 31 22 11 09
   Step II: 43 31 03 22 11 09
   Step III: 43 31 22 03 11 09
   Step IV: 43 31 22 11 03 09
   Step V: 43 31 22 11 09 03 (which is the last step)
   Hence [d]

5. Step IV: 92 86 71 69 15 19 06 63 58
   Option A:
   Input: 86 92 69 71 15 19 06 63 58
   Step I: 92 86 69 71 15 19 06 63 58
   Step II: 92 86 71 69 15 19 06 63 58 Hence option [A] cannot be the Input.
   Option B:
   Input: 15 86 19 92 06 69 63 58 71
   Step I: 92 15 86 19 06 69 63 58 71
   Step II: 92 86 15 19 06 69 63 58 71
   Step III: 92 86 71 15 19 06 69 63 58
   Step IV: 92 86 71 69 15 19 06 63 58 Hence option [B] cannot be the Input.

Option C:

Input:	15	19	06	63	58	86	92	69	71
Step I:	92	15	19	06	63	58	86	69	71
Step II:	92	86	15	19	06	63	58	69	71
Step III:	92	86	71	15	19	06	63	58	69
Step IV:	92	86	71	69	15	19	06	63	58

Hence option [c] is the correct Input statement.
Hence [C]

A systematic approach for solving Input - Output problems:

Identification of the type of problem:

The problems on input - output could be of any of the following four type: Shifting, Arrangement, Arithmetical operations and Miscellaneous. As the question would not mention what type of input - output problem is given, the first step is to identify the type of problem on the basis of the given example problem.

Arrangement:

First of all one should check whether there is any arrangement. In arrangement problems, the words would be continuously arranged in *an alphabetical order* or, if the input is consisting of numbers then numbers would be continuously arranged in *ascending or descending order.*

We should identify just by looking at the first two - three steps. One should check the following:

(i) If a word that comes alphabetically first (or last) is going to the first (or last place) in the first step and if a word that comes alphabetically second (or second last) is going to the second (or second last place) in the next step and so on?

(ii) In case input is consisting of numbers one should check if the smallest (or largest) number is going to the first (or last) place in the first step and if the number second smallest (or second largest) is going to the second (or second last) place in the next step and so on.

If the answers to the above questions are YES, it is an arrangement type of input - output problem.

Shifting:

If the case of arrangement is ruled out then one should check if there is any shifting taking place in the first two - three steps. One should check if any word (or number) of a given step is shifted from their position to a different position in the next step as per a pre-decided rule. Shifting may be a one step shifting (i.e. a single operation going on repeatedly) or a two step shifting (i.e. two different operations going on repeatedly) and so on.

Arithmetic operations:

If the input consists of numbers and the above two types i.e. arrangement and shifting are ruled out then one should check if this is a case of arithmetic operations. For this one should take first two - three numbers of the first two - three steps. If we find the relation between first numbers of first two steps the same as the relation between the second numbers of the first two steps, it means it is a case of arithmetic operations.

For example:

Input:	979	88	11	16	79	45
Step I:	25	16	2	7	16	9
Step II:	7	7	2	7	7	9

The rule here is that in every step we write the sum of the digits of the numbers given in the previous step. We continue this process till we get a single digit.

Miscellaneous:

These type of problems consists of a mixture of the arrangement, shifting and arithmetic operations in different steps.

SOLVED EXAMPLES

Directions for questions 1 to 5: Given an input line the machine arranges the words and numbers step by step in a systematic manner as illustrated below:

Input: subsidy 76 48 follow 35 next 63 must
Step I: 35 subsidy 76 48 follow next 63 must
Step II: 35 subsidy 48 76 follow next 63 must
Step III: 35 subsidy 48 next 76 follow 63 must
Step IV: 35 subsidy 48 next 63 76 follow must
Step V: 35 subsidy 48 next 63 must 76 follow

Output in Step V is the final output and Step VI is the last step.

As per the rules followed in the above steps, find out in each of the following questions the appropriate step for the given input.

1. If the second step of an input is "21 white direct 72 status front 37 69", how many more steps are required to complete the arrangement?
   A. Three B. Four
   C. Five D. Six
   E. None of these

2. What will be the third step for the input "17 85 pearls garland 67 93 restriction judgement"?
   A. 17 restriction 67 pearls garland 85 93 judgement
   B. 17 restriction 67 pearls 93 garland 85 judgement
   C. 17 restriction 85 pearls 67 garland 93 judgement
   D. 17 restriction 67 pearls 85 garland 93 judgement
   E. None of these

3. If the fourth step of an input is "35 wealth 52 task 72 57 jogging playground" what will definitely be the first step?
   A. task wealth 35 52 57 jogging 72 playground
   B. wealth task 35 52 57 jogging 72 playground
   C. wealth task 35 52 jogging 57 72 playground
   D. cannot be determined
   E. None of these

4. If the second step of an input is "26 shop finance 48 game music 63 37"; what will be the fifth step?
   A. 26 shop 37 music 48 finance game 63
   B. 26 shop 37 music finance 48 game 63

C. 26 shop 37 music 48 game finance 63
D. There is no fifth step
E. None of these

5. How many steps are required to complete the arrangement for the input "56 punish 48 find design 23 lavish 36"?
A. Seven B. Five
C. Four D. Eight
E. None of these

Solutions to questions. 1 to 5:

The given problem is a miscellaneous type of input - output problem based on arrangement of words and numbers.

The input is:
subsidy 76 48 follow 35 next 63 must

The rule here is:

In step I: smallest number (i.e. 35) goes to first place and in second step the word starting with the last letter of alphabetical order (subsidy) goes to second place, but here subsidy is already at second place so the second smallest number (i.e. 48 goes to third place in second step) and continuing in the same manner we get the final step.

Now all the problems can be solved easily.

1. Step II: "21 white direct 72 status front 37 69", as in step I the smallest number goes to first place and in step II, the word starting with last letter in alphabetical order goes to second place, then again in step III, the second smallest number should go to the third place and so on:
Step III: "21 white 37 direct 72 status front 69"
Step IV: "21 white 37 status direct 72 front 69"
Step V: "21 white 37 status 69 direct 72 front"
Step VI: "21 white 37 status 69 front direct 72"
Step VII: "21 white 37 status 69 front 72 direct" (Which is the last step)
Hence 5 more steps are needed.
Hence [C]

2. Input: "17 85 pearls garland 67 93 restriction judgement"
Step I: "17 restriction 85 pearls garland 67 93 judgement"
Step II: "17 restriction 67 85 pearls garland 93 judgement"
Step III: "17 restriction 67 pearls 85 garland 93 judgement"
Hence [D]

3. There might be more than 1 possibility for the Input so cannot be determined.
Hence [D]

4. Step II: "26 shop finance 48 game music 63 37"
Step III: "26 shop 37 finance 48 game music 63"
Step IV: "26 shop 37 music finance 48 game 63"
Step V: "26 shop 37 music 48 finance game 63"
Hence [A]

5. Input: "56 punish 48 find design 23 lavish 36"
Step I: "23 56 punish 48 find design lavish 36"
Step II: "23 punish 56 48 find design lavish 36"
Step III: "23 punish 36 56 48 find design lavish"
Step IV: "23 punish 36 lavish 56 48 find design"
Step V: "23 punish 36 lavish 48 56 find design"
Step VI: "23 punish 36 lavish 48 find 56 design"
Hence [E]

Directions for questions 6 to 8: Study the information given below and answer the questions.

A word arrangement machine, when given a particular input, rearranges it using a particular rule. The following is the illustration and the steps of the arrangement.

INPUT:	lemon	apple	choco	college	girl	
	dreams	room	book	calf		
STEP1:	choco	apple	lemon	college	girl	
	dream	calf	book	room		
STEP2:	lemon	apple	choco	dream	girl	
	college	room	book	calf		
STEP3:	calf	lemon	apple	book	choco	
	college	room	girl	dream		
STEP4:	apple	calf	lemon	book	choco	
	college	dream	room	girl		
STEP5:	lemon	calf	apple	college	choco	book
	girl	room	dream			
STEP6:	dream	lemon	calf	room	apple	book
	girl	choco	college			

6. Which of the following will not be Step 10 for the given input?
P. calf lemon dream room apple book college choco girl
Q. apple calf lemon book choco college dream room girl
R. lemon college dream choco calf room book girl apple
S. dream college lemon room calf choco apple girl book
A. P, Q and R B. P, R and S
C. P, Q and S D. R, Q and S

7. Indicate all the step numbers for which the following will not be an output "dream lemon calf book apple room girl choco college".
P. Step 7 Q. Step 8
R. Step 9 S. Step 12
A. P, Q and R B. P, R and S
C. P, Q and S D. R, Q and S

8. Mark all the arrangements that do not fall between step numbers 11 and 15
P. choco book dream calf college lemon apple girl room
Q. book dream college girl lemon calf apple room choco
R. book dream college room lemon girl apple calf choco
S. college dream book girl lemon calf choco room apple
A. P & Q B. P, R and Q
C. P, Q and S D. P,Q, R and S

Solutions to questions 6 to 8:

INPUT	lemon	apple	choco	college	girl	dream	room	book	calf	
	1	2	3	4	5	6	7	8	9	
Step 1	3	2	1	4	5	6	9	8	7	Rule 1
Step 2	1	2	3	6	5	4	7	8	9	Rule 2
Step 3	9	1	2	8	3	4	7	5	6	Rule 3
Step 4	2	9	1	8	3	4	6	7	5	Rule 4
Step 5	1	9	2	4	3	8	5	7	6	Rule 2
Step 6	6	1	9	7	2	8	5	3	4	Rule 3
Step 7	9	1	6	7	2	8	4	3	5	Rule 1
Step 8	6	1	9	8	2	7	5	3	4	Rule 2
Step 9	4	6	1	3	9	7	5	2	8	Rule 3
Step 10	1	4	6	3	9	7	8	5	2	Rule 4
Step 11	6	4	1	7	9	3	2	5	8	Rule 2
Step 12	8	6	4	5	1	3	2	9	7	Rule 3
Step 13	4	6	8	5	1	3	7	9	2	Rule 1
Step 14	8	6	4	3	1	5	2	9	7	Rule 2
Step 15	7	8	6	9	4	5	2	1	3	Rule 3

6. From the table Step 10 is:

1	4	6	3	9	7	8	5	2
lemon	college	dream	choco	calf	room	book	girl	apple

Hence P, Q and S cannot be output of step 10.
Hence [C]

7. From the table Step 8 is:

6	1	9	8	2	7	5	3	40
dream	lemon	calf	book	apple	room	girl	choco	college

So Q is the output of Step 8. Hence P, R and S cannot be output of step 8.
Hence [B]

8. By observing the table, we get none of the arrangement in the P,Q R and S will fall between Step 11 to 15.
Hence [D]

Directions for Q. 9 to 12: Answer the questions based on the following information. A number arrangement machine, when given a particular input, rearranges it following a particular rule.

Input:	245	316	436	519	868	710	689
Step 1:	710	316	436	519	868	245	689
Step 2:	710	316	245	519	868	436	689
Step 3:	710	316	245	436	868	519	689
Step 4:	710	316	245	436	519	868	689

Step 4 is the last step for the given input

9. If the input is given as "655, 436, 764, 799, 977, 572, 333", which of the following step will be "333, 436, 572, 655, 977, 764, 799"?
A. Step Third B. Step Second
C. Step Fourth D. None of the above

10. How many steps will be required to get the final output from the following input?
Input: 544, 653, 325, 688, 461, 231, 857
A. 6 B. 5
C. 4 D. None of the above

11. Step third for an input is "432, 433, 542, 666, 734, 355, 574", What will be the first step for the input?
A. 666, 542, 432, 734, 433, 574, 355
B. 542, 666, 734, 432, 433, 574, 355
C. 355, 574, 433, 432, 734, 666, 542
D. Cannot be determined

12. What will be the third step for the following input?
Input: 653, 963, 754, 345, 364, 861, 541
A. 541, 345, 754, 963, 364, 816, 653
B. 541, 345, 364, 653, 963, 754, 861
C. 541, 345, 364, 963, 754, 861, 653
D. 541, 345, 364, 653, 861, 754, 963

Solutions to questions. 9 to 12:

The logic here is that, in first step the number at the first place is interchanged by the number which has sum of its digit the least. In second step the number at the second place is interchanged by the number which has sum of its digits as the second smallest……and so on.

9. Input: "655, 436, 764, 799, 977, 572, 333"
Step 1: "333, 436, 764, 799, 977, 572, 655"
Step 2: "333, 436, 572, 799, 977, 764, 655"
Step 3: "333, 436, 572, 655, 977, 764, 799"
Step 4: "333, 436, 572, 655, 764, 977, 799"
Hence step (3) gives the desired output.
Hence [A]

10. Input: 544, 653, 325, 688, 461, 231, 857
Step 1: 231, 653, 325, 688, 461, 544, 857
Step 2: 231, 325, 653, 688, 461, 544, 857
Step 3: 231, 325, 461, 688, 653, 544, 857
Step 4: 231, 325, 461, 544, 653, 688, 857
Step 5: 231, 325, 461, 544, 653, 857, 688
Hence step (5) is the last step.
Hence [B]

11. Option [A]
Input: 666, 542, 432, 734, 433, 574, 355
Step 1: 432, 542, 666, 734, 433, 574, 355
Step 2: 432, 433, 666, 734, 542, 574, 355
Step 3: 432, 433, 542, 734, 666, 574, 355;
Hence, [A] is not the input.
Option [B]
Input: 542, 666, 734, 432, 433, 574, 355
Step 1: 432, 666, 734, 542, 433, 574, 355
Step 2: 432, 433, 734, 542, 666, 574, 355
Step 3: 432, 433, 355, 542, 666, 574, 734; Hence, [B] is not the input
Option [C]
Input: 355, 574, 433, 432, 734, 666, 542
Step 1: 432, 574, 433, 355, 734, 666, 542
Step 2: 432, 433, 574, 355, 734, 666, 542
Step 3: 432, 433, 355, 574, 734, 666, 542; Hence, [C] is not the input
Hence [D]

12. Input: 653, 963, 754, 345, 364, 861, 541
Step 1: 541, 963, 754, 345, 364, 861, 653
Step 2: 541, 345, 754, 963, 364, 861, 653
Step 3: 541, 345, 364, 963, 754, 861, 653
Hence [C]

Direction for the questions 13 - 15: Answer the questions based on the following information.

A word arrangement machine, when given a particular input, rearranges it following a particular rule. Following is the illustration of the input and the steps of arrangement:

Input: She was interested in doing art film
Step 1: art she was interested in doing film
Step 2: art was she interested in doing film
Step 3: art was in she interested doing film
Step 4: art was in film she interested doing
Step 5: art was in film doing she interested
Step 6: is the last step of the given input.

Now study the logic and rules followed in the above steps, find out appropriate step for the question given below for the given input.

13. Which of the following will be last step for the input given below?
Input: he is going out to search air
A. out is air to going search he
B. out is air to search going he
C. search he out is air to going
D. None of the above

14. If step 2 of an input is "not is the casino considering legal action", which step is: "not is casino action legal the considering"?
A. Step: 3 B. Step: 6
C. Step: 4 D. None of the above

15. How many steps will be required to get the final output from the following input?
Input: Father needs to check on the boy
A. Four B. Five
C. Six D. None of the above

Solutions to questions 13 to 15:

The machine arranges the input in the following manner in different steps on the basis of last alphabet of the word:

Input	**she**	**was**	**interested**	**in**	**doing**	**art**	**Film**
	e	**s**	**d**	**n**	**g**	**t**	**m**
Step 1	art	she	was	interested	in	doing	Film
	t	**e**	**s**	**d**	**n**	**g**	**m**
Step 2	art	was	she	interested	in	doing	Film
	t	**s**	**e**	**d**	**n**	**g**	**m**
Step 3	art	was	in	she	interested	doing	Film
	t	**s**	**n**	**e**	**d**	**g**	**m**
Step 4	art	was	in	Film	she	interested	doing
	t	**s**	**n**	**m**	**e**	**d**	**g**
Step 5	art	was	in	Film	doing	she	interested
	t	**s**	**n**	**m**	**g**	**e**	**d**

13. Input: He is going out to search air

Input	he	is	going	out	to	search	air
	e	s	g	t	o	h	r
LastStep	out	is	air	to	search	going	he
	t	s	r	o	h	g	e

Hence [B]

14. Step 2: "not is the casino considering legal action"
Step 3: "not is casino the considering legal action"
Step 4: "not is casino action the considering legal"
Step 5: "not is casino action legal the considering"
Hence [D]

15. Input: Father needs to check on the boy
Step 1: boy Father needs to check on the
Step 2: boy needs Father to check on the
Step 3: boy needs Father to on check the
Hence [D]

Some questions for practice:

Directions for Questions 1 - 5: Study the following Input Output flowchart and answer the questions given below:

Input: F, H, C, R, T, V, Q, D
Step 1: F, H, C, R, T, D, Q, V
Step 2: C, H, F, R, T, D, Q, V
Step 3: C, H, F, R, Q, D, T, V
Step 4: C, D, F, R, Q, H, T, V
Step 5: C, D, F, H, Q, R, T, V

Now try the following questions to check your understanding of the topic:

1. How many output steps will be there for the following input?
Input: alpha theta gamma lambda beta epsilon kappa pi
(a) 3 (b) 7
(c) 5 (d) 4
(e) 6

2. What will be Step 2 for the following input?
Input: viper cobra krait python alligator crocodile gorilla
(a) alligator cobra krait gorilla crocodile python viper
(b) alligator krait cobra python gorilla crocodile viper
(c) alligator cobra krait python crocodile gorilla viper
(d) alligator cobra krait python gorilla crocodile viper
(e) None of these

3. Which name will occupy the 5th position from the left in Step 3?
Input: Avash, Anant, Abhishek, Anwesha, Akhilesh, Amit, Amol, Amrindra
(a) Amit (b) Akhilesh
(c) Anant (d) Amol
(e) Amrindra

4. How many output steps will be there for the following input?
Input: A Story on how to manage your career and expectations.
(a) 8 (b) 9
(c) 7 (d) 6
(e) 5

5. Which word would be the middle word in the sequence after the fourth step?
Input: Remember that there is always room at the top.
(a) there (b) that
(c) room (d) the
(e) remember

Directions for Questions 6 - 10: Study the following Input Output flowchart and answer the questions given below:

Input : hum honge kamyab ek din
Step 1: din hum honge kamyab ek

Step 2: din hum honge ek kamyab
Step 3: din ek hum honge kamyab
Step 4: din ek honge hum kamyab

6. Which step will be the final step of the given input
Input: we shall overcome some day
(a) Step 3 (b) Step 4
(c) Step 5 (d) Step 6
(e) None of the above

7. What will be the last word of the final output of the given input
Input: aaj jane kee zid na karo
(a) jane (b) kee
(c) zid (d) na
(e) karo

8. In this question, an input and an output is given to you. You have to identify the which step will produce this output?
Input: main zindagi ka sath nibhata chala gaya.
Output: chala gaya ka main nibhata sath zindagi.
(a) Step 3 (b) Step 4
(c) Step 5 (d) Step 6
(e) This will not be any of the steps in the output.

9. Which will be the third word of the third step while processing the following input
Input: zindagi zindadili ka naam hai.
(a) zindagi (b) zindadili
(c) ka (d) naam
(e) hai

10. What will be last step of the given input
Input: shahrukh aamir salman saif aayub khan
(a) aamir aayub khan salman saif shahrukh
(b) aayub aamir khan saif salman shahrukh
(c) aayub aamir khan salman saif shahrukh
(d) aamir aayub khan saif salman shahrukh
(e) none of the above

Directions for questions 11 to 15: Study the following Input Output flowchart and answer the questions given below:

Input: Jawahar Lal Nehru was the first prime minister of India.
Step 1: India Jawahar Lal Nehru was the first prime minister of.
Step 2: India the Jawahar Lal Nehru was first prime minister of.
Step 3: India the prime Jawahar Lal Nehru was first minister of.
Step 4: India the prime of Jawahar Lal Nehru was first minister.
Step 5: India the prime of Lal Jawahar Nehru was first minister.
Step 6: India the prime of Lal Jawahar minister Nehru was first.
Step 7: India the prime of Lal Jawahar minister was Nehru first.
Step 8: India the prime of Lal Jawahar minister was first Nehru.

11. Which step will be last step of the output for the following input?
Input: Rahul Gandhi is son of Rajiv Gandhi
(a) Step 3 (b) Step 4
(c) Step 5 (d) Step 6
(e) None of the above

12. What will be the final output of the given input?
Input: CSAT Chronicle is the best magazine for the preparation of IAS.
(a) the the Chronicle magazine preparation of for IAS is CSAT best.
(b) the Chronicle the magazine of preparation for IAS is CSAT best.
(c) the the Chronicle magazine of preparation for is IAS CSAT best.
(d) the the Chronicle magazine of preparation for IAS is CSAT best.
(e) None of the above

13. What will be the second word of the second output of the given Input.
Input: Dr Manmohan Singh is the current prime minister of India.
(a) Dr (b) of
(c) the (d) is
(e) none of the above

14. What will be the last word of the last step of the given input?
Input: Sonia Gandhi hail from Italy
(a) Sonia (b) Gandhi
(c) hail (d) from
(e) Italy

15. What will be third step of the given input?
Input: Home Ministry is much more powerful than the Finance Ministry.
(a) Finance Home Ministry is much more powerful than the Ministry.
(b) Finance the Home Ministry is much more powerful than Ministry.
(c) Finance the Home more Ministry is much powerful than Ministry.
(d) Finance the Home Ministry more is much powerful than Ministry.
(e) the Finance Home Ministry more is much powerful than Ministry.

Directions for question number 16 to 20: Study the following Input Output flowchart and answer the questions given below:

Input: twinkle twinkle litle star how I wonder.
Step 1: I twinkle twinkle litle star how wonder.
Step 2: I how twinkle twinkle little star wonder.
Step 3: I how star twinkle twinkle litle wonder.
Step 4: I how star litle twinkle twinkle wonder.
Step 5: I how star litle wonder twinkle twinkle.

16. Which step will be the last step of the given input?
Input: I want to dance
(a) Step 2 (b) Step 3
(c) Step 4 (d) Step 5

(e) None of the above

17. What will be the last step of the given input?
Input: aaj phir jeene ki tamanna
(a) phir ki aaj jeene tamanna
(b) ki aaj phir tamanna jeene.
(c) ki aaj jeene tamanna phir.
(d) ki aaj phir jeene tamanna.
(e) None of the above.

18. Which step will be the last step of the input?
Input: paper and pulp is importantly important
(a) Step 3 (b) Step 4
(c) Step 5 (d) Step 6
(e) None of the above

19. What will be the second word of the last step of the given input?
Input: Raj and Simran will always be remembered for their roles in a blockbuster film
(a) a (b) be
(c) Raj (d) and
(e) for

20. What will be the last word of the last step for the given input?
Input: laptops have replaced computers in India
(a) laptops (b) computers
(c) replaced (d) India
(e) in

Directions for questions 21 - 25: A number arrangement machine arranges the number step by step in a particular order as shown below. Study the following Input Output flowchart and answer the questions given below:

INPUT:	326	628	875	452	364	543	247
Step 1:	628	326	875	452	364	543	247
Step 2:	628	247	326	875	452	364	543
Step 3:	628	247	326	875	364	452	543
OUTPUT:	628	247	326	875	364	543	452

21. What will be the output of the following input?
INPUT: 524 632 781 987 253 458 129
(a) 458 987 129 524 253 632 781
(b) 253 458 987 524 129 632 781
(c) 129 458 987 524 253 632 781
(d) 781 129 458 987 524 253 632

22. What will be the third step of the following input?
INPUT: 412 528 654 313 789 986 217 510
(a) 789 528 412 217 654 313 986 510
(b) 789 528 313 17 412 654 986 510
(c) 789 528 217 412 654 313 986 510
(d) 789 528 217 986 412 654 313 510

23. Which of the following can be the input if the first step of the code is
Step 1: 879 984 463 526 972 874 847 241
(a) 972 879 984 463 526 874 847 241
(b) 984 463 879 526 972 874 847 241
(c) 241 879 984 463 526 972 874 847
(d) Cannot be determined

24. How many steps will be there for the final output of the following Input code?
INPUT: 744 841 849 123 475 987 650
(a) 2 (b) 3
(c) 4 (d) 5

25. How many steps will be there for the final output of the following Input code?
INPUT: 741 873 952 416 544 957
(a) 2 (b) 3
(c) 4 (d) 5

Directions for questions 26 - 30: A word arrangement machine arranges the number step by step in a particular order as shown below. Study the following Input Output flowchart and answer the questions given below:

INPUT:	ahq	wte	dgt	jds	hxv	tyu	fda	atz
Step 1:	fda	ahq	wte	dgt	jds	hxv	tyu	atz
Step 2:	fda	atz	ahq	wte	dgt	jds	hxv	tyu
Step 3:	fda	atz	wte	ahq	dgt	jds	hxv	tyu
Step 4:	fda	atz	wte	hxv	ahq	dgt	jds	tyu
Step 5:	fda	atz	wte	hxv	ahq	tyu	dgt	jds
OUTPUT:	fda	atz	wte	hxv	ahq	tyu	jds	dgt

26. What will be the output of the following input?
INPUT: tra hrt btr tsd das arz can lay
(a) tra arz tsd lay can hrt btr das
(b) tra arz tsd lay hrt can btr das
(c) tra arz tsd lay can hrt das btr
(d) tra arz tsd lay can das btr hrt

27. What will be the fourth step of the following input?
INPUT: art ban cad cam mac far see gag
(a) Mac art cad cam ban far see gag
(b) Mac art cad cam see ban far gag
(c) mac art cad far cam see ban gag
(d) mac art cad far see ban cam gag

28. Which of the following can be the input to the given step?
STEP 1: maa bae tra tgv sdr dfg sdf vcb
(a) maa tra tgv bae sdr dfg sdf vcb
(b) sdr bae tra tgv maa dfg sdf vcb
(c) bae tra tgv sdr maa dfg sdf vcb
(d) Cannot be determined

29. How many steps will be there for the final output of the following Input code?
INPUT: riz trd msf man nab cal dog too sit
(a) 2 (b) 3
(c) 4 (d) 5

30. How many steps will be there for the final output of the following Input code?
INPUT: sat mar eav zac mop nob rog jol
(a) 6 (b) 5
(c) 4 (d) 3

Directions for questions 31 - 35: A word and number arrangement machine arranges them step by step in a particular order as shown below. Study the following Input

Output flowchart and answer the questions given below:

Input	bat	54	dog	78	call	2	him	95	son	47	see
Step 1	95	bat	54	dog	78	call	32	him	son	47	see
Step 2	95	bat	78	54	dog	call	32	him	son	47	see
Step 3	95	bat	78	call	54	dog	32	him	son	47	see
Step 4	95	bat	78	call	54	dog	47	32	him	son	see
Step 4	95	bat	78	call	54	dog	47	him	32	son	see
Output	95	bat	78	call	54	dog	47	him	32	see	son

31. What will be the output of the following input code? INPUT: 71 gas 47 tag sad rat zag 12 65 85
(a) 85 gas 71 rat 65 sad 47 tag 12 zag
(b) 85 zag 71 rat 65 sad 47 tag 12 gas
(c) 85 gas 71 rat 65 sad 47 12 tag zag
(d) 85 gas 71 rat 65 tag 47 sad 12 zag

32. Which step will be the last step for the following input? INPUT: raj gaj maj saj taj 12 13 14 15 16
(a) 5 (b) 6
(c) 7 (d) 8

33. Which of the following will be the fourth step for the following Input?
INPUT: east or west india rocks 15 08 19 47
(a) 47 east 19 india 15 rocks or west 08
(b) 47 east 19 india 15 or west rocks 08
(c) west 47 east 19 india 15 or rocks 08
(d) 47 east 19 rocks india 15 or west 08

34. How many steps will be there for the final output of the following code?
INPUT: 25 jack and 15 bill went 75 hill
(a) 4 (b) 5
(c) 6 (d) 7

35. The input followed by a step is given. Identify the step number for the given step?
INPUT: twinkle 56 and 85 wrinkle 69 bright 47 stars
Step: 85 and 69 bright twinkle 56 wrinkle 47 stars
(a) 5 (b) 3
(c) 2 (d) 4

Directions for questions 36 - 40: A number arrangement machine interchanges two numbers step by step in a particular order as shown below. Study the following Input Output flowchart and answer the questions given below:

INPUT: 532 787 461 326 355 144 984 357 949
Step 1: 144 787 461 326 355 532 984 357 949
Step 2: 144 532 461 326 355 787 984 357 949
Step 3: 144 532 461 326 355 357 984 787 949
This step is the last step.

36. What will be the last step of the following input?
INPUT: 359 451 202 650 131 475 984 698 365
(a) 202 131 451 650 365 475 359 984 698
(b) 202 131 451 650 365 475 359 698 984
(c) 202 131 451 650 365 359 984 475 698
(d) 131 451 650 365 475 359 984 698 202

37. Which of the following can be the input, if the first step is:
STEP 1: 132 456 154 124 415 215 474
(a) 456 154 124 132 415 215 474
(b) 132 124 154 456 415 215 474
(c) 415 456 154 124 132 215 474
(d) None of these

38. How many steps will be there for the following input? INPUT: 149 497 151 546 541 651 355
(a) 4 (b) 5
(c) 6 (d) 7

39. How many steps will be there for the following input? INPUT: 521 454 874 845 101 540 415
(a) 3 (b) 4
(c) 5 (d) 6

40. The input followed by a step is given. Identify the step number for the given step?
INPUT: 125 164 655 325 546 998 745
STEP: 125 325 164 546 655 998 745
(a) 6 (b) 5
(c) 4 (d) 3

Directions for questions 41 to 45: A number arrangement machine arranges two numbers step by step in a particular order as shown below. Study the following Input Output flowchart and answer the questions given below:

INPUT: 151 542 875 358 744 987 856
Step 1: 358 151 542 875 744 987 856
Step 2: 358 987 151 542 875 744 856
Step 3: 358 987 856 151 542 875 744
Step 4: 358 987 856 875 151 542 744
Step 5: 358 987 856 875 744 151 542
Step 6: 358 987 856 875 744 542 151
This is the last and the final step.

41. What will be the last step of the following input?
INPUT: 601 943 978 976 940 785 987
(a) 785 943 601 940 978 987 976
(b) 978 987 601 940 976 785 943
(c) 978 943 601 940 987 976 785
(d) 978 987 976 785 943 601 940

42. Which of the following can be the input, if the first step is:
STEP 1: 139 456 154 124 415 215 474
(a) 124 456 139 154 415 215 474
(b) 456 154 139 124 415 215 474
(c) 139 154 456 124 415 215 474
(d) None of these

43. How many steps will be there for the following input? INPUT: 147 498 151 545 549 650 354
(a) 4 (b) 5
(c) 6 (d) 7

44. How many steps will be there for the following input? INPUT: 521 454 876 845 109 540

417

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

45. The input followed by a step is given. Identify the step number for the given step?
INPUT: 698 654 301 520 687 549 155
STEP: 549 698 687 654 301 520 155
(a) 2 (b) 3
(c) 4 (d) 5

Directions for questions 46 to 50: A number arrangement machine arranges/interchanges two numbers step by step in a particular order as shown below. Study the following Input Output flowchart and answer the questions given below:

INPUT: 145 561 897 178 985 931 357 901
STEP 1: 901 561 897 178 985 931 357 145
STEP 2: 901 931 897 178 985 561 357 145
STEP 3: 901 931 145 178 985 561 357 897
STEP 4: 901 931 145 357 985 561 178 897
STEP 5: 901 931 145 357 561 985 178 897
STEP 6: 901 931 145 357 561 178 985 897
This is the last and the final step.

46. What will be the last step of the following input?
INPUT: 144 874 982 102 165 324 415 554
(a) 102 415 324 144 554 165 874 982
(b) 102 165 874 982 415 324 144 554
(c) 102 554 144 415 324 165 874 982
(d) 874 982 102 415 324 144 554 165

47. Which of the following can be the input, if the first step is:
STEP 1: 603 355 544 425 415 533 473 587
(a) 355 544 425 603 415 533 473 587
(b) 425 355 544 603 415 533 473 587
(c) 415 603 355 544 425 533 473 587
(d) None of these

48. How many steps will be there for the following input? INPUT: 258 515 204 571 164 998 133 120
(a) 5 (b) 4
(c) 3 (d) 2

49. How many steps will be there for the following input? INPUT: 584 891 645 310 301 359 968 324
(a) 4 (b) 5
(c) 6 (d) 7

50. The input followed by a step is given. Identify the step number for the given step?
INPUT: 145 320 491 984 351 100 661 977
STEP: 100 320 145 351 661 491 984 977
(a) 2 (b) 3
(c) 4 (d) 5

■■■■

6 SEQUENCE AND SERIES

A sequence is a set of numbers, alphabets, pictures or algebraic expressions defined by a rule. A term is an element of the sequence. Terms in the sequence are denoted by the letter T or U with a subscript to show its place in the sequence.

Sequence and series questions are the most common of all the questions on reasoning. In these questions a certain series is given to the student and he has to find logic behind what is happening in the series. And on the basis of that logic, he may be asked to find the next term in the series or some odd number or term in the series.

These types of questions generally check the logical bend of a candidate and it can judge the analytical abilities of any candidate. It also checks the familiarity of a student with numbers and his ability to calculate and relate fast with the numbers. And as a public servant, a person should posses these qualities as he should be able to think fast and should be able to set targets for the next term, year or session. Calculations and analytical qualities has to one of the chief quality of all the public servant, otherwise, he will never be able to judge the correctness of the data provided to him. And while setting the targets of any project, one need to study the previous trends and such type of questions can judge the appropriateness of a person in such type of a job.

Now, there are basically two type of questions in this category, first one being find the next term in the series and the second one being find the wrong term in the series. But in both of them, a student need to first understand the logic behind the series. As unless and until he has cracked the series, he will not be able to solve the same, and once he has cracked the series, the remaining things will just be a cake walk for him.

While talking about the type of series, this subdivision can be done in two ways. The first division will be based on the mode of division, where in a series can be based on numbers, alphabets or picture. Although the concept used in these series are same but the mode of presenting those logic are different. Number series is the easiest to understand and crack, as numbers can be easily calculated and thus can easily be solved. Although the same numbers can be converted into alphabets and then it becomes slightly difficult to solve, as these alphabets need to be converted into the numbers first and then it need to be solved. Now, converting these alphabets into numbers consumes a good amount of time. Now, next type of series is picture series. A picture series is a combination of different series packed in one picture. The best way to solve a picture series is to decode different series and then eliminating all the options except one.

Now there can be many a series which can be asked in a sequence and series questions. Some of these series are as Adding arithmetic Series, Fibonacci Series, Base Conversion Series, Multiplication Series, Pattern Series, Sum and Difference Series, Root Series, Similar Look Series, Proportional Series, Sequencial Difference Series, Alterante Series, Sum of Certain Numbers Series, Power Series, Advanced Algebra Series. Let us discuss all of them one by one over here.

Adding Arithmetic series is one of the most common series among all these questions. At the same time, these are easiest to crack as well. In these series questions, difference between every consecutive term of the series follow a pattern of addition or subtraction. This pattern may not be obtained by first level of checking difference, thus a student should keep on checking the difference of these terms till next two levels. I generally advice all the students to check the difference of all sets of consecutive numbers and again repeating the same process till he finally gets a constant term and then back calculation can easily give us the answer.

Alternate Series is the second most popular series and the most difficult to crack. In these types of questions, there is not one rather two or more series mixed among them-selves. For example: 1, 2, 3, 3, 5, 5, 7, 7, 9, 11 is a series wherein alternate numbers are odd numbers and the other set of alternate numbers are prime numbers. Another variation in the same is where all the terms consist of both the series. For example: 12,33,55,77,911 is a combination of two series wherein the first term of all the numbers form a series of odd numbers and the second term of the series is a series of prime numbers.

Another popular series in Fibonacci Series wherein, every term in the series is the sum of previous two terms. Thus, for such a series only first two terms need to be defined and all the remaining terms of the series can be calculated by adding the last two terms of the series. For example: 1, 2, 3, 5, 8, 13, 21, 34, 55…. In this series, first two terms of the series are 1 and 2 and these are the only two terms defined in this series and all the remaining terms of this series are obtained by adding the previous two terms like 3 is the summation of 1 and 2, 5 is summation of 2 and 3 and so on.

Base conversion series is another, difficult and popular series. If we know Base system, then this series is obtained by converting terms of the series from base 10 to other bases in each and every term. This type of a series has an end point which can be obtained by attaining a single digit number.

Multiplication Series is a series wherein all the terms are obtained by multiplying the previous terms by a constant term. This type of a series can be an increasing or decreasing series depending on the factor which is being multiplied to the term. For example if the term to be multiplied by something which is more than 1 then the series will be an increasing series and if this factor is less than 1 then the term will be a decreasing series. In case of an increasing series, this series will keep on increasing but in case of a decreasing series, this series cannot decrease beyond zero. Another variation in this type of series is alternate positive negative number which can be obtained if the multiplying factor is a negative number.

Sum and difference series is a series wherein all the terms of the series are obtained by adding or subtracting certain number of previous terms of the series. Again here in some initial terms of the series are defined and the remaining terms of the series are obtained by adding or subtracting certain previous terms of the series. Fibonacci Series can be termed as a sub set of this series. But further more there can be summation of previous three terms and so on.

Pattern Series are some typical series wherein certain pattern is followed in all the terms of the series. These are typical series either one knows or one does not know. For example a series like 1, 4, 9, 16, 25…this series seems to be simple as it is the squares of all natural numbers. But again either you know this series or you do not know his series and it comes only though practice and there is no short-cut to learn in these types of series.

So, these were some typical series, which one must know and should keep in mind while solving a question on sequence and series. Now, the biggest question is how to master these series. One should practice as many questions on sequence and series as possible and only the practice of these questions can help you master these kinds of questions. And believe me, just like all other areas of aptitude test, there is no short-cut to success and proficiency in these types of questions.

Following are a few questions, which would help you start your practice these questions.

Directions for question number 1 to 10: find the next term in series

1. 2 4 8 16 _
   (a) 20 (b) 24
   (c) 32 (d) 64

2. 0 3 8 15 _
   (a) 31 (b) 25
   (c) 24 (d) 23

3. 2 6 12 20 _
   (a) 30 (b) 32
   (c) 28 (d) 40

4. 12 22 42 82 _
   (a) 164 (b) 162
   (c) 122 (d) 144

5. 149 4916 91625 _
   (a) 253649 (b) 254964
   (c) 163649 (d) 162536

6. 110 156 210 272 _
   (a) 310 (b) 342
   (c) 356 (d) 370

7. 7 26 63 124 _
   (a) 210 (b) 216
   (c) 224 (d) 215

8. 10 15 25 40 _
   (a) 50 (b) 55
   (c) 60 (d) 65

9. 18 2764 125216 _
   (a) 216512 (b) 343729
   (c) 512343 (d) 343512

10. 248 3927 41664 525125 _
    (a) 616126 (b) 1012525
    (c) 636126 (d) 636216

Directions for question number 11 to 20: in the given series, there is one term which does not belong to the given series. Find the term which does not belong to the given series.

11. 111 248 369 41664 525125
    (a) 111 (b) 248
    (c) 369 (d) 41664

12. 789 101112 131415 151617 181920
    (a) 101112 (b) 151617
    (c) 181920 (d) 131415

13. 0 1 10 11 100 111
    (a) 111 (b) 100
    (c) 0 (d) 11

14. 2 10 28 65 126 217
    (a) 2 (b) 10
    (c) 65 (d) 217

15. 1427 2964 31625 425216 536343
    (a) 1427 (b) 425216
    (c) 2964 (d) 31625

16. 12 20 30 36 56
    (a) 12 (b) 20
    (c) 36 (d) 30

17. 10 50 100 150 200
    (a) 10 (b) 50
    (c) 150 (d) 200

18. 22 34 48 60 70
    (a) 22 (b) 34
    (c) 60 (d) 70

19. 135 7911 131415 171921 232527
    (a) 135 (b) 7911
    (c) 131415 (d) 171921

20. 147 101316 172023 252729 313437
    (a) 147 (b) 172023
    (c) 252729 (d) 101316

Directions for questions 21 and 22: Find the next term in the series.

21. 1310 1613 1916 2219 2522 ____
    (a) 2625 (b) 2925

(c) 2822 (d) 2825

22. 149 98 145 42 ___
(a) 21 (b) 20
(c) 84 (d) 141

Directions for questions 23 to 28: Answer these questions referring to the symbol letter number sequence given below:

3 P 5 T W % 6 # H * K 2 & L A 4 % F 0 @ M N ! X 9 8 D V 7 ? Q < 1

23. How many symbols are followed by a number and preceded by an alphabet in the given series?
(a) 1 (b) 2
(c) 3 (d) 4

24. How many alphabets are immediately preceded and followed by a symbol?
(a) 1 (b) 2
(c) 3 (d) 4

25. Three of the following four are similar in relation to their positions in the above sequence and hence form a group, which one of them does not belong to that group?
(a) PT5 (b) HK*
(c) LA4 (d) M!N

26. Each symbol exchanges its position with its immediate right element. Now, how many letters are there in the sequence which are immediately followed by a number and immediately preceded by a symbol?
(a) 0 (b) 1
(c) 2 (d) 4

27. W6H is to 7D9 the same way as L4F is to
(a) M0% (b) @F4
(c) 0%A (d) @0F

28. Which of the following indicates the total number of symbols, letters and numbers respectively4, which get eliminated from the sequence when every second element of the sequence from the left is dropped from the sequence?
(a) 3, 6, 7 (b) 6, 7, 3
(c) 6, 4, 6 (d) 5, 4, 7

Directions for questions 29 to 34: Answer these questions referring to the symbol letter number sequence given below:

Q @ 5 B % 8 & S 0 * R $ 4 T ! M L # 6 V ^ 1 C ? X 7 > Z G 3 < D

29. How many symbols are followed by a number and preceded by an alphabet in the given series?
(a) 5 (b) 4
(c) 3 (d) 2

30. How many alphabets are immediately preceded and followed by a symbol?
(a) 1 (b) 2
(c) 3 (d) 4

31. Three of the following four are similar in relation to their positions in the above sequence and hence form a group, which one of them does not belong to that group?
(a) Q@B (b) 8S*
(c) T!L (d) C?7

32. Each symbol exchanges its position with its immediate right element. Now, how many letters are there in the sequence which are immediately followed by a number and immediately preceded by a symbol?
(a) 2 (b) 3
(c) 4 (d) 5

33. B%8 is to GZ> the same way as *R$ is to
(a) X?C (b) ?C1
(c) C1^ (d) ?1V

34. Which of the following indicates the total number of symbols, letters and numbers respectively4, which get eliminated from the sequence when every second element of the sequence from the left is dropped from the sequence?
(a) 3, 5, 7 (b) 5, 7, 4
(c) 3, 7, 5 (d) 4, 5, 7

Directions for questions 35 to 41: Find the next term in the series.

35. 2 7 14 23 34 ____
(a) 51 (b) 49
(c) 46 (d) 47

36. 4 11 30 67 128 ____
(a) 259 (b) 216
(c) 219 (d) 263

37. 149 2916 31625 42536 ____
(a) 536216 (b) 525125
(c) 53664 (d) 53649

38. 4 7 30 77 248 ____
(a) 729 (b) 735
(c) 723 (d) 728

39. 143 264 385 4106 5127 ____
(a) 6137 (b) 6158
(c)6179 (d) 6148

40. 310 418 528 640 754 ____
(a) 856 (b) 870
(c) 864 (d) 872

41. 3 7 16 32 57 ___
(a) 90 (b) 104
(c) 93 (d) 95

Directions for questions 42 to 50: Fill the missing term.

42. 52 84 124 ___ 228
(a) 176 (b) 178
(c) 172 (d) 182

43. 2 5 11 17 __ 31
(a) 20 (b) 23
(c) 19 (d) 18

44. 39 43 45 __ 55 61 69
(a) 47 (b) 49
(c) 51 (d) 53

45. 21 27 31 39 __ 53 59
(a) 45 (b) 43
(c) 47 (d) 49

46. 31 63 128 __ 522 1049
(a) 256 (b) 257
(c) 259 (d) 263

47. abd efh ijl __ qrt uvx
(a) mno (b) mnp
(c) mop (d) lmo

48. a c f __ o u
(a) j (b) i
(c) k (d) n

49. af5 dk7 __ hs11 ly13
(a) go9 (b) fi10
(c) gl8 (d) gp9

50. 26 77 229 684 ___ 6141
(a) 2052 (b) 2048
(c) 2050 (d) 2056

■■■■

7 SEATING ARRANGEMENT

Just like other questions of reasoning, there is no hard and fast rule on how solve these questions. Practice is the only key to master these questions.

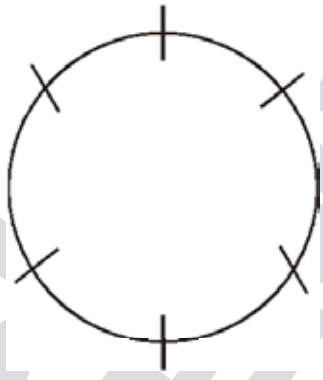
Firstly, how to deal with questions on seating arrangement. First thing first, if a question says that a person is sitting on the right hand side corner, then it means your right hand which is different from the right hand of the sitters. But if question says that A is sitting on the right of B, then it means that right of the person or the seating arrangement. Another common mistake which students tend to commit is that if a question says that A is sitting on the left of B, then it does not mean immediate left rather it means somewhere in the left of B and thus we cannot conclude that A and B are sitting together with B on the left of A. Rather in most of questions, when data refers that A is left of B, then generally is not immediate left and it is used as a good trap and generally student fall in the trap.

Generally the questions on seating arrangement appear in the papers as a set of three to four questions and it does make a sense to spend some time on the complete set before actually jumping on the questions. While solving the questions, student should start with making a diagram depicting the positions of all the possible arrangement as per the requirement of the data and then he should start satisfying all the conditions by putting up the right persons on the right places as per the requirement of the question. Let us understand this with the help of given question.

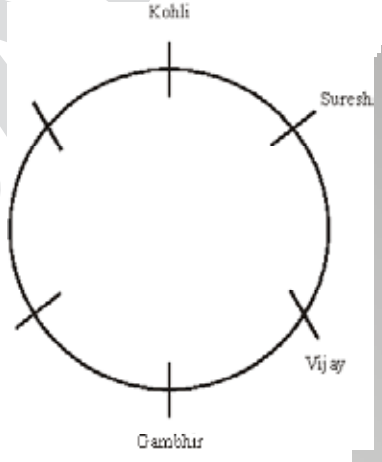
Example

- 6 Boys are sitting in a circle and facing towards the centre of the circle.
- Sehwag is sitting to the right of Sachin but he is not just at the left of Vijay.
- Suresh is between Kohli and Vijay.
- Gambhir is sitting to the left of Vijay.

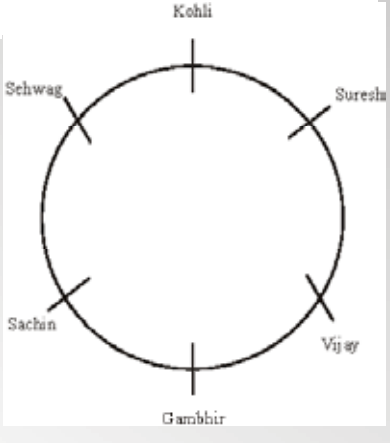
In this question, first we will realize that there need to be circular table with six seats around this. So initially, we have to make a table with six chairs around it as



In the next step, Suresh is in between Kohli and Vijay, which means it can be either Kohli Suresh Vijay or Vijay Suresh Kohli but as soon as we realize that Gambhir is sitting to the left of Vijay, second possibility is removed and we get their arrangement as Kohli Suresh Vijay Gambhir. Let us put these players in the figure as follows



Now, coming to the second condition, Sachin is sitting to the right of Sehwag. An then the final seating arrangement can be obtained as follows



Now, once we have got this figure, we have got

the seating arrangement of each and every man. Now irrespective of how many questions are being asked in the question, we shall be able to answer all the questions in no time.

Now let us look into another question on seating arrangement wherein some students are sitting in a straight line.

Example:

- Eleven students A, B, C, D, E, F, G, H, I, J and K are sitting in first line facing to the teacher.
- D, who is just to the left of F, is to the right of C at second place.
- A is second to the right of E who is at one end.
- J is the nearest neighbor of A and B and is to the left of G at third place.
- H is next to D and is at the third place to the right of I

In this question all the students are sitting in a straight line. So let us start with assuming eleven chairs in a straight line. D is just left of F means that these two should make D F. Now, realizing D is is second to the right of C, we get their arrangement as C _ D F.

Now coming to third statement, we realize that E is at one of the ends and A is second to the right of E. thus we get left end as E _ A. from the next statement, we realize that J is sitting in between A and B which extend left end as E _ A J B. Now, realizing that J is to the left of G at the third position, we get left end as E _ A J B _ G.

Now, coming to the last statement, H is next to D, our initial arrangement get filled in form of C H D F. now realizing that H is third to right of I, our combination becomes I _ C H D F.

Now, combining both the arrangements, we get total seating arrangement as E _ A J B I G C H D F. now, only person left to be arranged is K and there is only one place to be filled. Thus overall arrangement of these eleven students comes out to be as E K A J B I G C H D F.

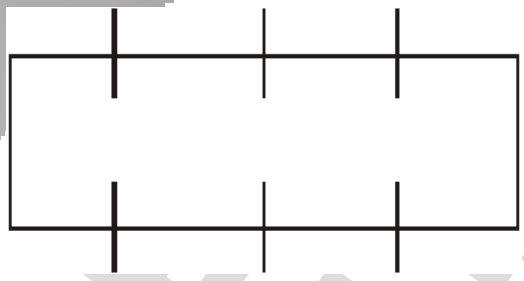
Again once, we have got the complete seating arrangement, any question on this arrangement can easily be solved without consuming much of a time. Thus in all these seating arrangement questions, it does make a sense to devote some time in solving the questions and then finally answering the question, does not take much of a time.

Now coming to another typical type of seating arrangement, wherein certain number of persons is sitting against certain number of persons on a rectangular table facing each other.

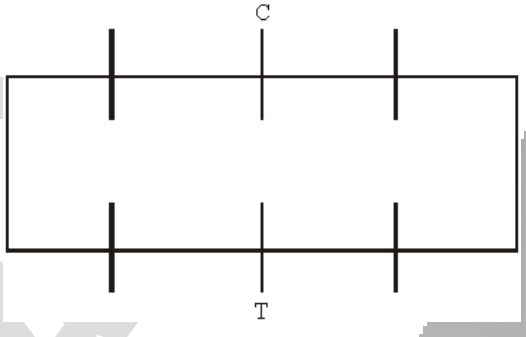
Example:

- A, B and C are three boys while R, S and T are three girls. They are sitting such that the boys are facing the girls.
- A and R are diagonally opposite to each other.
- C is not sitting at any of the ends.
- T is left to R but opposite to C.

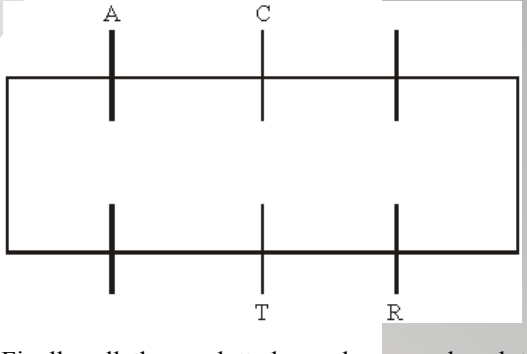
In this question, firstly we need to assume and draw a rectangular table with three chairs on each side something like this



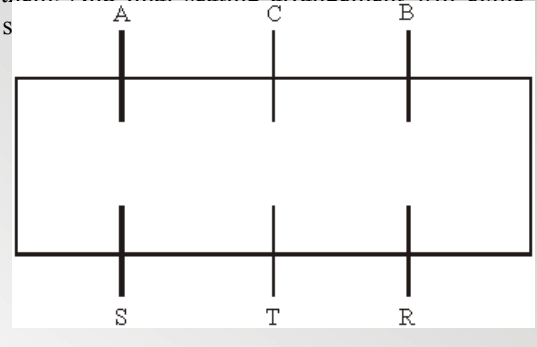
Now, if we look at the third statement, we will realize that C is sitting at center of one of the sides of the table and according to the forth statement, T is sitting opposite to C. These points can be plotted on the rectangular table something like this



Now, combining second and forth statement together we will realize that T is on the left of R and A is diagonally opposite to R. these points can also be placed on the figure to improve the figure to the next level like this



Finally, all the unplotted members can be plotted in the figure as there is only one boy and one girl left to be put in the diagram and there is only one position for both of them. And final seating arrangement will come out to be s



Now, practice the following questions to gauze your level of understanding of the complete topic.

Directions for questions 1 & 2: Five friends Amitabh, Dharmendra, Sashi, Amjad and Sanjeev are carrying apples from their home to the market. Everyone works till the task is completed. Also their speeds are the same. Sashi can carry 5 kgs more than Sanjeev. Sanjeev cannot carry more than Amitabh. Dharmendra can carry twice the weight than Amjad can, who can carry 4 kgs less than Sashi. Weights carried by them do not take fractional values.

1. Who carries the least weight?
   (a) Sanjeev (b) Sashi
   (c) Amjad (d) Data Insufficient

2. If Sashi and Dharmendra can carry equal weight, how much can both of them carry together in a single trip?
   (a) 4 kgs (b) 8 kgs
   (c) 16 kgs (d) 32 kgs

Directions for questions 3 to 8: Akhil invites some of his friends along with their wives for a party at his house. There are 2 tables, rectangular and circular in his house. Prateek, Quadir, Roshan, Santosh, Tarun and Utpal comes with their wives Arshy, Bindu, Chaya, Deepika, Elena and Falguni. They are two be seated at the two tables and six persons can be seated on each of the tables. One person sits at the shorter length of the rectangular table and 2 persons sit at the larger length of the table. The following conditions apply:

I. Prateek, Quadir and Arshy, Bindu sit at the rectangular table.
II. Tarun, Elena and Utpal always sit together.
III. Chaya and Deepika sit opposite each other; Elena and Falguni sit opposite each other.
IV. Deepika and Elena sit at the same table.

3. Which of the following does not sit at the rectangular table?
   (a) Roshan (b) Prateek
   (c) Santosh (d) Utpal

4. Who is sitting to the right of Tarun?
   (a) Chaya (b) Deepika
   (c) Elena (d) Cannot be determined

5. If Chaya is sitting to the right of Tarun and Falguni to his left, who is sitting to the left of Falguni?
   (a) Roshan (b) Deepika
   (c) Utpal (d) Cannot be determined

6. If Prateek sits opposite Quadir who sits to the left of Bindu who sits to the left of Arshy. Who sits opposite Bindu?
   (a) Tarun (b) Santosh
   (c) Roshan (d) Cannot be determined

7. If Santosh sits opposite to Bindu, who sits to the left of Quadir? (refers to the data in the previous question)
   (a) Arshy (b) Santosh
   (c) Prateek (d) Roshan

8. Six girls are seated in row on chairs. Manyata has two girls seated to one of her sides. Chaya is seated between Sarika and Katrina. Priyanka sits to the extreme right. If Neelam is the sixth girl, which chair she sit on, if chairs are numbered '1' to '6' starting from the left.
   (a) 4 (b) 5
   (c) None (d) Cannot be determined

Directions for questions 9 to 11: The lectures of a class are to be scheduled. Eight teachers are to take a lecture each.

I. Falguni and Neha deliver their lectures after Chaya. Only one person delivers a lecture between Chaya's and Falguni's lectures.
II. Falguni does not deliver the fifth from the last lecture.
III. Suhani delivers the first lecture.
IV. Elena delivers a lecture immediately before or after Neha's lecture.
V. Ishita delivers a lecture immediately before or after Falguni's lecture.
VI. Deepika can only take lecture after 2 lactures of chaya. Mandakini can deliver any of the lectures.

9. If Elena delivers the seventh lecture, who delivers the last lecture?
   (a) Elena (b) Chaya
   (c) Neha (d) Cannot be determined

10. Who delivers the fifth from last lecture?
   (a) Neha (b) Ishita
   (c) Elena (d) Deepika

11. The third lecture is delivered by……..
   (a) Chaya (b) Mandakini
   (c) Neha (d) Ishita

Directions for questions 12 to 16: Four boys Amitabh, Bobby, Chetan and Dharmendra; and four girls Mandakini, Nargis, Ojasvi and Priyanka are sitting such that between every two boys there is one girl. Mandakini sits at one end and Dharmendra at the other. Bobby sits next to Priyanka and to her right.

12. If Dharmendra sits next to Priyanka and to her left, and Mandakini and Ojasvi are one seat away from each other, who is sitting between Ojasvi and Nancy?
   (a) Chetan (b) Amitabh
   (c) Bobby (d) Amitabh or Chetan

13. If Dharmendra sits next to Priyanka to her left and Nargis and Ojasvi are one seat away from each other, who is sitting between Amitabh and Chetan?
   (a) Ojasvi (b) Nargis
   (c) Priyanka (d) Ojasvi or Nargis

14. If Dharmendra and Bobby sit one seat away from each other, then which of the following must be true?
   (a) Mandakini and Priyanka are sitting on alternate seats.
   (b) Priyanka sits between Dharmendra and Bobby.
   (c) Mandakini and Priyanka cannot sit on alternate seats.
   (d) Priyanka cannot sit between Dharmendra and Bobby.

15. If Priyanka and Mandakini are sitting on alternate seats then:
   (a) 3 people are sitting between Dharmendra and Bobby.
   (b) 3 or more people are sitting between Dharmendra and Bobby.
   (c) Bobby is to the left of Dharmendra, although they are not sitting on alternate seats.
   (d) 5 people are sitting between Dharmendra and Mandakini.

16. If Bobby sits one seat away from Amitabh on one side and Chetan on the other side, then
   (a) Priyanka and Marry are on alternate seats.
   (b) Priyanka sits between Chetan and Bobby.
   (c) Bobby sits between Priyanka and Nargis.
   (d) None of the above.

Directions for questions 17 to 20: Six boys - A, B, C, D, E and F and 2 girls - P and Q occupy seats on a rectangular dining table with four on one side and four on other. The chairs are numbered from 1 to 8 in a clockwise direction.

Below are some additional information given about their seating arrangement.

(i) The two girls are on opposite sides of the table but they are not sitting exactly opposite to each other. Also neither of them is sitting on a corner seat.
(ii) B and D are sitting on diagonally opposite corner seats.
(iii) F is on seat no. 4.
(iv) A and C are on the same side but not adjacent to each other.

Based on this information answers the following questions:

17. Which seat does E occupy?
(a) 2 (b) 8
(c) 7 (d) 3

18. If C and P are on opposite sides, which seat does Q occupy?
(a) 2 (b) 3
(c) 7 (d) Cannot be determined

19. Who occupies seat no. 8?
(a) C (b) A
(c) E (d) Cannot be determined

20. Which of the following pairs can never sit adjacent to each other?
(a) E and Q (b) A and P
(c) D and Q (d) F and P

Directions for questions 21 to 24: 8 friends A, B, C, D, E, F, G and H are sitting around a circular table facing centre. A and B never sit together. D and F always sit together. E sits third to the right of D and second to the left of B. G is diametrically opposite to A. One person sits between G and H.

21. Who sits second to the left of D?
(a) D (b) G
(c) E (d) A

22. Who sits between E and B?
(a) A (b) G
(c) H (d) C

23. If all the persons are arranged in ascending order of their names, with A sitting on its own place and in clockwise direction, then, how many people will not have to change their places?
(a) 0 (b) 1
(c) 2 (d) 3

24. Who is sitting diametrically opposite to H?
(a) A (b) F
(c) D (d) C

Directions for questions 25 and 26: There are 6 chairs kept around a circular chair. 2 boys and 2 girls are to be seated there. No girl want to sit beside a boy.

- C doesn't want to sit beside A.
- D is a girl and sits in front of A.

25. Who is sitting third to the left of the one sitting to the right of D?
(a) C (b) B
(c) A (d) Empty Chair

26. Who is the second girl?
(a) C (b) A
(c) B (d) Either C or A.

Directions for questions 27 and 28: In a hexagon if 6 people (A, B, C, D, E, F) are made to sit on its five edges such that

- A is immidiate left to C who is opposite to B.
- E sits third to the left of A.
- D sits between A and B.

27. Where does F sit?
(a) Between B and E
(b) Second to the left of A
(c) Next to the right of C
(d) Opposite to E

28. Which of the following statements are correct?
A. 3 people are sitting in between B and A.
B. D and E are adjacent to each other.
C. The person who is third to the left of C is sitting opposite to the one who is second to the right of
D. If all the persons are made to sit alphabetically in order starting from A keeping A's place unchanged, then places of 4 persons change.
(a) A and B (b) A, C and D
(c) A only (d) B and C

Directions for questions 29 to 33 : Read the following information carefully and answer the questions given below :

There are Six friends U, V, W, X, Y and Z are sitting around a circular table facing towards the centre of table in the college canteen. All of them have ordered different items (Pakoda, Samosa, Dosa, Dhokla, Kachori and Paratha) to eat. All of them wearing Caps of different colours, i.e. orange, pink, black, white, green and blue. Not in the same order

I. The persons who are in black and green Caps have neither ordewhite for Pakoda nor for Dosa.
II. The persons who have ordered for Pakoda, Dosa and Kachori are neither in orange Cap nor in pink.
III. The only person who is between Y and Z eats Samosa. The person who is on the left side of the person in orange Cap does not eat Paratha.
IV. U is neither in orange Cap nor on the immediate left of the person who has ordered for Dhokla.
V. One who has ordered for Pakoda is seated opposite to the person wearing blue Cap, while the person whose Cap is of black colour is on the left of the person who has ordered for Kachori.
VI. X has ordered for Dhokla and the colour of his Cap is black. He is facing the person who has ordered for Samossa.
VII. W has not ordered for Dosa while Z has not ordered for Pakoda.
VIII. One who has ordered for Paratha is on the immediate right of the person in orange Cap but on the immediate left of the person who has ordered for Dosa.

29. Who among the following is in orange Cap?
(a) U (b) Z

(c) W (d) V

30. The only person, who is between Y and X, is wearing Cap of the colour
(a) white (b) blue
(c) pink (d) green

31. Who among the following has ordered for Kachori?
(a) U (b) V
(c) Z (d) W

32. Which of the following is correctly matched?
(a) X- green-Dhokla (b) W-white-Dosa
(c) Y-white-Pakoda (d) A-pink-Kachori

33. The person who has ordered for prantha is wearing cap of which colour ?
(a) green (b) white
(c) orange (d) pink

Directions for questions 34 to 36 : Seven sprinters Amit, Boman, Chetan, Deep, Ehsan, Furkan and Gopal are standing in a line. Gopal is to the left of Boman and to the right of Deep. Amit is on the right of Chetan. Amit and Deep have one sprinter between them. Ehsan and Boman have two sprinters between them.There are two sprinters between Deep and Furkan.

34. Who is on the extreme right?
(a) Gopal (b) Anmit
(c) Furkan (d) Ehsan

35. Who is exactly in the middle?
(a) Ehsan (b) Furkan
(c) Deep (d) Gopal

36. Who is on the extreme left?
(a) Ehsan (b) Deep
(c) Chetan (d) Boman

Directions for questions 37 to 40 : Six students U, V, W, X, Y and Z are standing in a line having back towards south. W is standing between U and Y. X is not standing at the end. Y is standing immediate left to V. Z is not standing at the right end.

37. How many persons are standing to the right of X?
(a) One (b) Two
(c) Three (d) Four

38. Which of the following pairs is standing to one side of X?
(a) YZ (b) UV
(c) UZ (d) None of these

39. Who is immediate left of W?
(a) V (b) U
(c) Either Z or V (d) Cannot be determined

40. Who is standing at the right end?
(a) W (b) V
(c) X (d) Cannot be determined

Directions for questions 41 to 36 : Study the given information carefully and answer the questions that follow

(i) Alok, Baljeet, Chandu, Damodar, Eshwar, Fardeen and Ganpat are sitting and all of them are facing east.
(ii) Damodar is on the immediate left of Chandu.
(iii) Ehsan is havng Baljeet as neighbour who is sitting at an extreme end.
(iv) Ganpat is sitting between Ehsan and Fardeen.
(v) The person who is sitting third from the south end is Damodar.

41. Ehsan is sitting to left of whom ?
(a) Damodar (b) Baljeet
(c) Alok (d) None of these

42. Which of the following pairs of people are sitting at the extreme ends?
(a) Alok and Baljeet (b) Alok and Chandu
(c) Damodar and Baljeet (d) Ehsan and Damodar

43. Name the person who should change place with Chandu such that he gets the third place from the north end.
(a) Alok (b) Damodar
(c) Ganpat (d) Fardeen

44. Immediately between which of the following pairs of people is Damodar sitting?
(a) Alok and Chandu (b) Alok and Fardeen
(c) Ehsan and Fardeen (d) Chandu and Fardeen

45. Which of the conditions (*i*) to (*v*) given above is not required to find out the place in which Alok is sitting?
(a) (*i*) (b) (*ii*)
(c) (*iii*) (d) All the required

Directions for questions 46 to 47 : Read the following information carefully and answer these questions :

(i) There are six rooms on a floor of a hostel in two rows in North and South directions which are allotted to Praveen, Qureshi, Ravi, Sandeep, Tanush and Upendra.
(ii) Qureshi is in a room in North direction and is not next to room of Sandeep.
(iii) Sandeep and Upendra are in diagonally opposite rooms.
(iv) Tanush gets a room in North direction and Ravi, next to Upendra, gets a room in south direction.

46. The rooms of which of the other pairs than Sandeep and Upendra, are diagonally opposite to each other?
(a) Qureshi and Praveen (b) Praveen and Ravi
(c) Qureshi and Ravi (d) Tanush and Ravi

47. Which of the following combinations gets South facing rooms?
(a) Tanush, Ravi and Upendra
(b) Upendra,Ravi and Praveen
(c) Sandeep, Ravi and Tanush
(d) Data inadequate

Directions for questions 48 to 50 : Read the following information carefully and answer the questions given below :

Six friends Amar, Ballu, Champak, Dheeraj, Ehsan and Fukku are sitting in two lines, three in each line

- Ehsan is not at the end of any line.
- Fukku is second to the right of Dheeraj.
- Champak, the neighbour of Ehsan, is sitting diagonally opposite to Dheeraj.
- Fukku is the neighbour of Ballu.

48. Which of the following are sitting diagonally opposite to each other?
(a) Fukku and Ballu (b) Amar and Dheeraj
(c) Champak and Fukku (d) Amar and Fukku

49. Which of the following belongs to the same line?
(a) Amar and Ehsan (b) Amar and ballu
(c) Amar and Fukku (d) Fukku and Champak

50. Which of the following are in one of the two lines?
(a) Fukku, Damodar and Champak
(b) Champak, Amar and Ballu
(c) Damodar,Ballu and Fukku
(d) Amar, Ballu and Fukku

■■■■

8 SYLLOGISMS

A syllogism is a type of logical reasoning which consists of three statements: Two premises (prepositions) and the third is the conclusion that is necessarily drawn from both the premises and not just one of them.

In other words, a syllogism is a form of argument which contains a major premise, a minor premise and a conclusion.

The questions which are asked in this section contain two or more statements and these statements are followed by one or more conclusions. You have to find out which of the conclusions logically follow from the given statements. The statements have to be taken true even if they seem to be at variance from the commonly known facts.

For such questions, you can take the help of Venn Diagrams. On the basis of the given statements, you should draw all the possible diagrams, and then derive the solution from each of these diagrams separately. Finally, the answer common to the all the diagrams is taken.

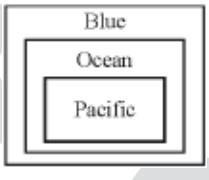
For example:

1. All oceans are blue.
2. Pacific is an ocean.

Hence, Pacific is blue.

Here, the first two statements are premises and the third one is the conclusion derived from the two premises. The validity of the conclusion that whether it is true or not can be verified with the help of Venn diagrams.

The diagrammatic representation of the above example is as follows:



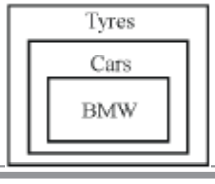
From the above diagram, it is clear that if all the Oceans are Blue and Pacific is an Ocean, then Pacific is also Blue.

Another example:

1. All cars have tyres.
2. BMW is a car.

Hence, BMW has tyres.

The diagrammatic representation is as follows:



From the above diagram, it is clear that if all the Cars have Tyres and BMW is a car, then BMW has Tyres.

The questions that might appear in the exams may be of the following format:

In each of the following questions two statements are given and these statements are followed by two conclusions numbered (1) and (2). You have to take the given two statements to be true even if they seem to be at variance from commonly known facts. Read the conclusions and then decide which of the given conclusions logically follows from the two given statements, disregarding commonly known facts.

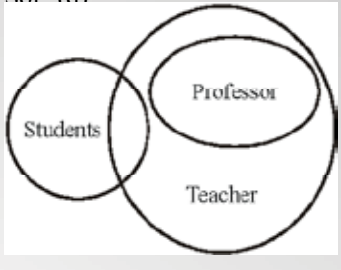
Give answer:

(a) If only (1) conclusion follows
(b) If only (2) conclusion follows
(c) If either (1) or (2) follows
(d) If neither (1) nor (2) follows and
(e) If both (1) and (2) follow.

1. Statements: Some girls dance. All dancers are beautiful.
   Conclusions: (1) All beautifuls are girls.
   (2) Some girls are beautiful.
   Sol: (b)

Hence, only (2) is possible.

2. Statements: All professors are teachers. Some teachers are students.
   Conclusion: (1) Some professors are students.
   (2) All students are professors.
   Sol: (d)



From the Venn diagram, we get that it is not necessary that some or all professors are students. Hence, none of the conclusions follow.

Questions for practice

Directions for questions 1 to 10: In each of the following questions two statements are given and these statements are followed by two conclusions numbered (1) and (2). You have to take the given two statements to be true even if they seem to be at variance from commonly known facts. Read the conclusions and then decide which of the given conclusions logically follows from the two given statements, disregarding commonly known facts.

Give answer:

(a) If only (1) conclusion follows
(b) If only (2) conclusion follows
(c) If either (1) or (2) follows
(d) If neither (1) nor (2) follows and
(e) If both (1) and (2) follow.

1. **Statements:** All dogs bark. Some dogs bite.
   Conclusions: (1) Some dogs bark and bite.
   (2) Some dogs bark but don't bite.

2. **Statements:** Some vegetables are green. Spinach is green. **Conclusions:** (1) Spinach is vegetable.
   (2) Spinach is not a vegetable.

3. **Statements:** All boys play cricket. Some boys play carom.
   Conclusions:
   (1) Some boys play both cricket and carom. (2) Some boys play only cricket.

4. **Statements:** All tables are chairs. Some chairs are strong. **Conclusions:** (1) All tables are strong.
   (2) Some tables are strong.

5. **Statements:** Some pens are pencils. Some pencils are erasers.
   Conclusions: (1) Some erasers are not pencils.
   (2) Some erasers are pens.

6. **Statements:** Some books are trees. Some trees are girls. **Conclusions:** (1) Some girls are books.
   (2) Some trees are not girls.

7. **Statements:** All laptops are mobiles. All mobiles are phones.
   Conclusions: (1) All phones are laptops.
   (2) All laptops are phones.

8. **Statements:** Some cycles are cars. Some cars are not bikes.
   Conclusions: (1) Some cycles are bikes.
   (2) No bike is a cycle.

9. **Statements:** All tigers are rats. Some rats are lions.
   Conclusions: (1) Some tigers are lions.
   (2) Some lions are not tigers.

10. **Statements:** Every boy is a tree. Every computer is a boy.
    Conclusions: (1) Every tree is a computer.
    (2) Every computer is a tree.

Directions for questions 11 - 20: In each of the following questions two statements are given. Which are followed by four conclusions (1), (2), (3) and (4). Choose the conclusions which logically follow from the given statements.

11. **Statements:** No door is house. All the houses are rooms.
    Conclusions:
    (1) No door is room.
    (2) No room is door.
    (3) Some rooms are houses.
    (4) All the rooms are houses.
    (a) Only (1) and (3) (b) Only (2) and (4)
    (c) Only (3) and (4) (d) Only (3)

12. **Statements :** All men are veterebrates. Some mammals are veterbrates.
    Conclusions :
    (1) All vertebrates are men.
    (2) All men are mammals.
    (3) All mammals are men.
    (4) Some verebrates are mammals.
    (a) Only (1) (b) Only (2)
    (c) Only (3) (c) Only (4)

13. **Statements:** All bags are bottles. Some bottles are tiffins.
    Conclusion:
    (1) Some bags are tiffins.
    (2) All bottles are tiffins.
    (3) Some tiffins are bags.
    (4) Some bottles are not tiffins.
    (a) Only (1) and (2) (b) Only (2)
    (c) Only (3) and (4) (d) Only (3)

14. **Statement:** Some cups are saucers. All saucers are plates. **Conclusion:**
    (1) Some cups are plates.
    (2) All plates are saucers.
    (3) Some saucers are not cups.
    (4) Some saucers are not plates.
    (a) Only (1) (b) Only (3) and (4)
    (c) Only (1) and (3) (d) Only (1), (3) and (4)

15. **Statement:** Some cakes are toffees. Some toffees are not sweet.
    Conclusion:
    (1) Some cakes are sweet.
    (2) Some toffees are not cakes.
    (3) Some toffees are sweet.
    (4) Some sweets are not cakes.
    (a) Only (1) and (3) (b) Only (2) and (4)
    (c) Only (1), (2) and (3) (d) None of them.

16. **Statements:** Every shoe is a cap. Not every cap is a shirt.
    Conclusions:
    (1) Some shoes are shirt.
    (2) Some caps are not shirts.
    (3) Some shirts are caps.
    (4) Some shoes are not shirts.
    (a) Only (1) (b) Only (2) and (3)
    (c) Only (2) and (4) (d) Only (2)

17. **Statements:** Some dancers are singers. No dancer is a teacher.

Conclusions:
(1) Some singers being dancer is a possibility.
(2) Some teachers being singer is a possibility.
(3) Some singers are not dancer.
(4) No teachers are dancers.
(a) Only (1), (2) and (4) (b) Only (3)
(c) Only (3) and (4) (d) Only (4)

17. **Statements:** Some movies are shows. All shows are drama.
Conclusions:
(1) Some movies are drama.
(2) Some dramas are not movies.
(3) All movies being drama is a possibility.
(4) None movies being drama is a possibility.
(a) Only (1), (2) and (4) (b) Only (2)
(c) Only (3) and (4) (d) Only (1), (3) and (4)

19. **Statements:** Some flowers are fruits. Not all fruits are leaves.
Conclusions:
(1) Some fruits are leaves.
(2) Some leaves are flowers.
(3) None leaves being flower is a possibility.
(4) Some flowers are not leaves.
(a) Only (1) and (2) (b) Only (3) and (4)
(c) Only (3) (d) Only (4)

20. **Statements:** Some fruits are vegetables. Some fruits are seeds.
Conclusions:
(1) Some vegetables are seeds.
(2) Some vegetables are not seeds.
(3) All vegetables are seeds can be a possibility.
(4) Some vegetables are seeds but not fruits can be a possibility.
(a) Only (1) and (2) (b) Only (3) and (4)
(c) Only (3) (d) Only (4)

Directions for questions 21 to 30: In each of the following questions three or four statements are given. Which are followed by two conclusions (1) and (2). Mark the answer as per the following codes.

Mark (a) if only conclusion (1) follows.
Mark (b) if only conclusion (2) follows.
Mark (c) if both (1) and (2) follows.
Mark (d) if none of the conclusions follow.

21. **Statements:** All dogs are cats.
Some cats are rats.
All rats are stupid.
Some dogs are not stupid.

Conclusions: (1) Some cats are not stupid.
(2) Some rats are dogs.

22. **Statements:** All smart are boys.
Some girls are smart.
All girls are humans.
All humans are mortal.

Conclusions: (1) Some boys are mortal.
(2) All boys are humans.

23. **Statements:** Some bottles are plastic.
Some glasses are bottles.
All bottles are coloured.

Conclusions: (1) Some plastics are coloured.
(2) Some plastics are glasses.

24. **Statements:** Some pens are markers.
All markers are black.
Some pens have refills.

Conclusion: (1) Some markers have refills is a possibility.
(2) Some pens are black.

25. **Statements:** Ramu is a cyclist.
Some cyclists are racers.
All racers are adventurists.
Ramu is an adventurist.

Conclusions: (1) Ramu is a racer.
(2) Some adventurist being cyclist but not a racer is a possibility.

26. **Statements:** Some men are young.
All women are young.
All young are human.

Conclusion: (1) Some men are not human.
(2) Some women being not human is a possibility.

27. **Statements:** Some blacks are green.
Some greens are red.
All blues are blacks.

Conclusion: (1) Some reds are blues.
(2) Some greens are blues.

28. **Statements:** No sheep is a cow.
All cows are goats.
Some goats are buffaloes.
All buffaloes are sheeps.

Conclusion: (1) Some goats are sheeps.
(2) No cows are buffaloes.

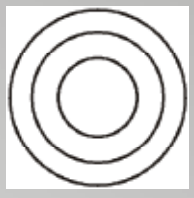
29. **Statements:** All fans are bulbs.
No bulbs are CFLs.
All CFLs are geysers.
All geysers are fans.

Conclusion: (1) Some bulbs are geysers.
(2) All bulbs being geysers is a possibility.

30. **Statements:** Some papers are notebooks.
All notebooks are copies.
Some copies are not books.
All books are papers.

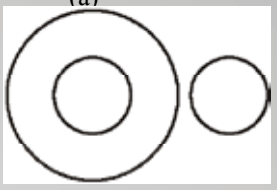
Conclusion: (1) Some books are notebooks.
(2) Some books are copies.

Directions for questions 31 to 40: Given below are five possible membership schemes. In each case, mark the one you feel appropriate description of the three listed items.

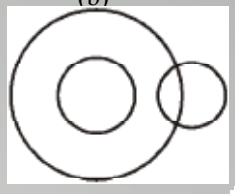


(a)

(b)



(c)



(d)

31. Hours, Minutes, Seconds.

32. Notebook, Book, textbook

33. Reptiles, Lizards, Cows

34. Dogs, Animals, Humans

35. Polygons, Triangles, Scalene Triangles

36. State, City, Village

37. Living Beings, Plants, Animals

38. Human, Carnivore, Tiger

39. Mammals, dolphins, Whales

40. Doctor, Engineer, Man

Directions for questions 41 to 50: In each of the following questions some statements are given which are followed by some conclusions. Mark the option which follows the best.

41. **Statement:** Either Ram runs or he is not thirsty.
Conclusions:
(1) Ram runs.
(2) Ram is thirsty.
(3) Ram doesn't run.
(4) Ram isn't thirsty.
(a) (1) and (2) (b) (2) and (3)
(c) (1) and (3) (d) None of these.

42. **Statements:** The bottle is either round or cylindrical.
Conclusions:
(1) The bottle is not round.
(2) The bottle is cylindrical.
(3) The bottle is not cylindrical.
(4) The bottle is round.
(a) (1) and (4) (b) (2) and (4)
(c) (1) and (3) (d) (3) and (4)

43. **Statements:** All keyboards have buttons. Some keyboards play music. Some keyboards are used in Computers.
Conclusions:
(1) All Computers have keyboards.
(2) All keyboards don't play music.
(3) Computer keyboards don't play music.
(4) Computer keyboards have buttons
(a) (1) and (2)
(b) (1), (2), and (4)
(c) Only (4)
(d) (1), (2), (3) and (4)

44. **Statements:** Either humans eat or they don't rest.
Conclusions:
(1) Humans don't eat.
(2) Humans don't rest.
(3) Humans eat.
(4) Humans rest.
(a) (1) and (2) (b) (3) and (4)
(c) (1) and (4) d. (2) and (3)

45. **Statement:** If Ramu walks he eats Apple.
Conclusions:
(1) Ramu doesn't walk.
(2) Ramu doesn't eat Apple.
(3) Ramu walks.
(4) Ramu eats Apple.
(a) (1) and (2) (b) (2) and (3)
(c) (4) and (3) (d) (2) and (1)

46. **Statement:** One should either study or shouldn't play games.
Conclusions:
(1) One should not study.
(2) One should play games.
(3) One should study.
(4) One shouldn't play games.
(a) (1) and (2) (b) (2) and (3)
(c) (3) and (4) (d) None of them

47. **Statement:** Either Shyam doesn't go to a party or he drinks.
Conclusions:
(1) Shyam doesn't go to a party.
(2) Shyam doesn't drink.
(3) Shyam drinks.
(4) Shyam goes to a party.
(a) (1) and (2) (b) (1) and (4)
(c) (3) and (4) (d) None of these

48. **Statements:** The phone is either switched off or it is not ringing.
Conclusions:
(1) The phone is switched off.
(2) The phone is ringing.
(3) The phone is not switched off.
(4) The phone is not ringing.
(a) (1) and (4) (b) (2) and (3)
(c) (3) and (4) (d) None of these

49. **Statements:** Either it is raining or it is cloudy today.
Conclusions:
(1)It is not raining today. (2) It is cloudy today.
(3) It is raining today. (4) It is not cloudy today.
(a) (1) and (4) (b) (2) and (3)
(c) (1) and (3) (d) (1) and (2)

50. **Statements:** Pinku is either far or I can't see him.
Conclusion:
(1) Pinku is not far. (2) I cannot see him.
(3) Pinku is far. (4) I can see him.
(a) (1) and (2) (b) (1) and (4)
(c) (2) and (3) (d) None of these

9 VENN - DIAGRAM

Venn-diagram is another topic of good importance from reasoning as well as from GMA's point of view. In totality, we can expect a good number of questions from this topic in the complete paper. There have been a good number of questions from this topic in all the aptitude tests happening in India and even abroad. And CSAT should not be any exception to the rule. Even in the previous format of GS paper, there used to be some questions from set theory in GMA part.

To start with, let us understand the meaning of set first. A set is a well-defined group of objects and all these objects are called elements. If A is a set and a is an element of this set then it is said that a belongs to A. And above all, all the elements of a set need to satisfy some quality as per the definition. A set can be a finite or infinite depending upon the definition. For example a set of all the natural numbers less than 100 will be a finite set where as a set of all the natural numbers will be an infinite set.

Some basic definition:

Universal set is defined as a set of all the elements under consideration.

An empty set is defined as a set which contains no element. It is represented by {}. We need to understand here that $\{\} \neq \{0\}$.

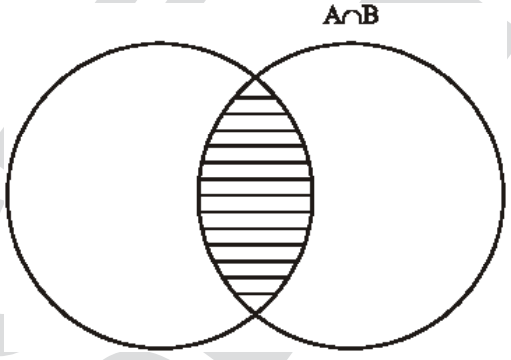
Intersection of two sets is defined as all the common elements of two sets and is represented by symbol $"\cap"$ whereas the union of two sets is a set which contains all the elements of both the sets in question and is represented by the symbol $"\cup"$.

For example if A={1,3,5,7,9} and B={2,3,5,7}, then $A \cup B = \{1,2,3,5,7,9\}$ and $A \cap B = \{3,5,7\}$.

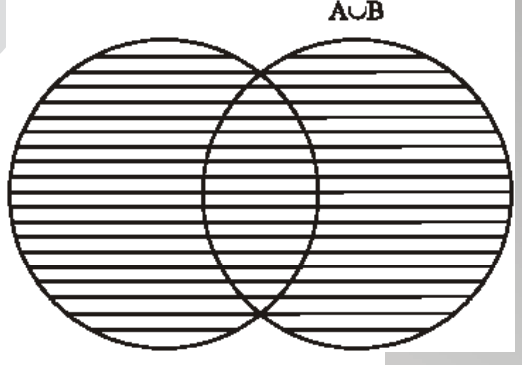
A-B is defined as all the terms of A which are not present in B. For example if A={1,3,5,7,9} and B={2,3,5,7}, then $A - B = \{1,9\}$.

A is defined as the subset of B if all the elements of A are also present in B. In such a situation, B will also be called superset of A. An empty set is a sub set of all the sets whereas a universal set is super set of all the sets. At the same time, all sets are subset of it-self and super set of it-self. For any set with n elements, there will be exactly 2" subsets out of which one will be empty set and one will be the set it-self.

Venn-diagram is a pictorial representation of all certain set. Generally, in venn-diagram, all the sets are represented by circles with the area inside the circle being a part of the set and area outside the circle does not belonging to the set. For example the figure given below presents $A \cap B$.



In this case there are two sets A and B, which in this figure are represented with the help of two circles and the overlap of these two circles will be called or intersection of these two sets. And the following figure presents union of the two sets. In the following figure, two sets A and B are represent by two circles and area inside these two particular circles presents these two sets and area outside these two circles does not belong to these sets. And thus the shaded area will include all the elements present in either of the two sets which is the definition of the union.



Now, if there are two sets A and B, then $A \cap B$ and $A \cup B$ are defined by the following formulae .

Using this formula, we can say that $A \cup B$ can be obtained by adding A and B. but since the common area of A and B has been added twice, so it has to subtracted once in form of $A \cap B$.

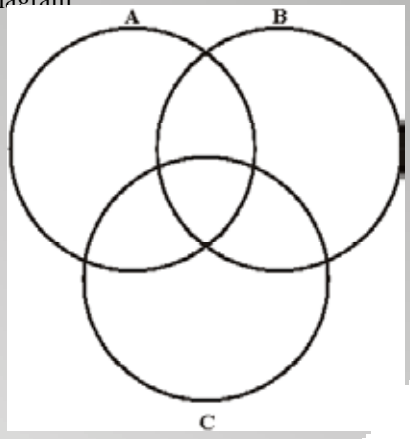
In a similar way, if there are three sets A, B and C, then $A \cup B \cup C$ can be calculated by the given formulae

$$A \cup B \cup C = A + B + C - A \cap B - A \cap C - B \cap C + A \cap B \cap C$$

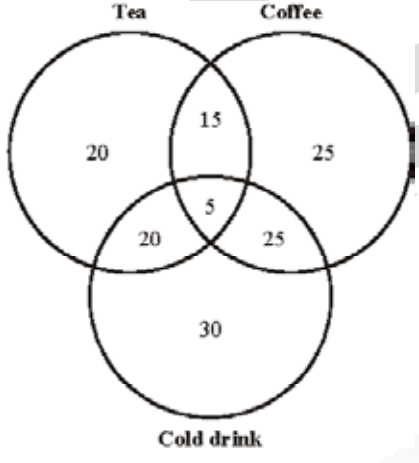
In the given formulae, we can say that while calculating $A \cup B \cup C$, A, B and C are added once each. But since intersection of the three has been added twice so we need to subtract them once and finally intersection of all

of them has been added thrice and has been subtracted thrice, so we need to finally add them once. Thus we get the given formula.

This formula can also be represented by the given venn diagram



Now let us look at one problem which will help us understand these concepts a little better. Suppose, there is a school, wherein 60 drink tea, 70 drink coffee, 80 drink cold drink. Among the same group of students, there are 20 preferring tea and coffee, 25 prefer tea and cold drink and 30 prefer coffee and cold drink. In the same school, there are 5 students, who prefer tea, coffee and cold drink. Now, let us try to put in on a venn diagram. First thing which we need to understand in that is 25 prefer tea and cold drink then it does not mean that these persons will not prefer coffee and more importantly, these 25 is a sub set of 60 who prefer tea and 80 who prefer cold drink. All these questions should start with the intersection of all the three. Now, there are 5 who prefer all the three drinks. Thus 15 prefer only tea and coffee, 20 prefer only tea and cold drink and 25 prefer only coffee and cold drink. Now, coming to persons preferring only tea, out of 60 students, 5 prefer all the three drinks, 15 prefer tea and coffee and 20 prefer tea and cold drink thus, only 20 prefer only tea and so on an so forth. The following data can be put on a venn diagram in the following manner.



We can also solve the given question with the help of formulae as

$$A \cup B \cup C = A + B + C - A \cap B - A \cap C - B \cap C + A \cap B \cap C$$

$$= 60 + 70 + 80 - 20 - 25 - 30 + 5 = 210 - 75 + 5 = 140$$

Thus total number of students, who prefer at least one of the three drinks, is 140.

Now, try to solve the following questions on the basis of the knowledge that you have gathered from this article.

Directions for questions 1 to 3: There are 200 students in a school. 140 opt for Maths, 100 opt for Biology and all of them have atleast opted for one of the subjects.

1. How many of them opted for both the subjects?
   (a) 60 (b) 80
   (c) 40 (d) Cannot be determined
2. How many of them opted for Maths only?
   (a) 100 (b) 60
   (c) 40 (d) Cannot be determined
3. How many of them opted for Biology only?
   (a) 100 (b) 60
   (c) 40 (d) Cannot be determined

Directions for questions 4 to 6: There are 100 employees in an office. 40 like coffee, 60 like tea and 20 of them don't like any of them.

4. How many of them like both tea and coffee?
   (a) 20 (b) 40
   (c) 10 (d) 30
5. How many of them like only Coffee?
   (a) 10 (b) 20
   (c) 30 (d) 40
6. How many of them like only tea?
   (a) 20 (b) 30
   (c) 40 (d) 60

Directions for questions 7 to 10: A survey is conducted among 200 students in a college. 100 like Hiking, 120 like Rafting and 80 like Cycling. 60 students like Hiking and Rafting, 40 like Rafting and Cycling, 10 students liked all the three and 20 students did not like any of the three.

7. How many students liked at least two of the three?
   (a) 90 (b) 110
   (c) 120 (d) 80
8. How many students liked only two of the three?
   (a) 90 (b) 100
   (c) 80 (d) 120
9. How many students liked Hiking and Rafting but not Cycling?
   (a) 10 (b) 50
   (c) 20 (d) 30
10. How many students liked only Rafting?
    (a) 20 (b) 30
    (c) 40 (d) 50

Directions for questions 11 to 13: 400 people came to watch movies. 220 of them like movie A, 200 of them liked movie B and 210 liked Movie C. 120 liked movies A and B, 80 liked movie B and C. 20 liked all the three movies. Since they came to watch movies so everyone liked atleast one of the movies.

11. How many liked at least any two movies?
(a) 100 (b) 200
(c) 210 (d) 300

12. How many of them like movie A and B but not C?
(a) 80 (b) 90
(c) 100 (d) 110

13. How many of them liked movie A only?
(a) 70 (b) 80
(c) 90 (d) 100

Directions for questions 14 to 17: In a survey involving 300 people, 40% liked Chess, 50% liked Cricket and 190 persons liked Badminton. 80 liked Chess and Cricket, 30% liked Cricket and Badminton, 10% liked all. 20 people didn't like any of these games.

14. What %age of people liked any two of three games?
(a) 30 (b) 40
(c) 50 (d) 60

15. What no of people liked Chess and Badminton but not Cricket?
(a) 10 (b) 20
(c) 30 (d) 40

16. What is the ratio of people liking Cricket only and Badminton only?
(a) 3 : 5 (b) 4 : 5
(c) 1 : 9 (d) 1 : 6

17. What is the percentage of people liking only two of the three games?
(a) 20 (b) 30
(c) 40 (d) 50

Directions for questions 18 to 20: In a group of 500 people, 300 can speak English. 240 can speak Hindi, 120 can speak English and Spanish, 60 can speak Hindi and Spanish, 80 speak English and Hindi and 20 can speak all the three. Everyone in the group can speak atleast anyone of the three languages.

18. How many of them can speak Spanish?
(a) 200 (b) 220
(c) 240 (d) 260

19. How many of them can speak atleast two languages? (a) 200 (b) 220
(c) 240 (d) 260

20. How many of them can speak English and Hindi only?
(a) 40 (b) 50
(c) 60 (d) 80

Directions for questions 21 to 23: In a college, there are total of 500 students. There are total 3 specializations available in the college - Administration, Law and Services. And all the students need to select at least one of the three specializations. If we leave all the students with specialization in Law then there will be 200 students with exactly one specialization and 50 students with exactly 2 specializations. If we leave all the students with specialization in Services then there will be 250 students with exactly one specialization and 25 students with exactly 2 specializations. Similarly, if we leave all the students with specialization in Administration then there will be 250 students with exactly one specialization and 25 students with exactly 2 specializations.

21. How many students are specializing in Services?
(a) 100 (b) 175
(c) 225 (d) Cannot be determined

22. How many of these students are specializing in all the three subjects?
(a) 25 (b) 50
(c) 75 (d) 100

23. How many of these students are specializing in either Law or Administration but not both?
(a) 250 (b) 300
(c) 325 (d) 400

Directions for questions 24 to 26: A survey was conducted on newspaper readers of a colony. It was observed that there were 60 readers of TOI, 50 readers of HT and 30 readers of TH. There were 20 who used to read TOI and HT, 15 who read TOI and TH and 10 used to read HT and TH. There were 5 who used to read all the three newspaper.

24. How many of the survey people read exactly one newspaper?
(a) 140 (b) 100
(c) 70 (d) 65

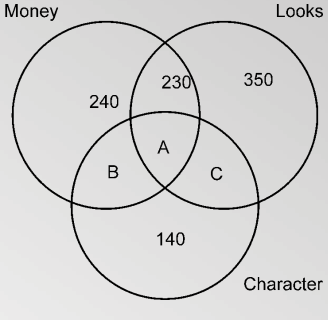
25. How many of the survey people read HT but not TH?
(a) 25 (b) 30
(c) 40 (d) 50

26. What is the total number of persons surveyed?
(a) 100 (b) 150
(c) 190 (d) cannot be determine

27. There are 100 students in a class roll numbered from 1 to 100. All even number roll number like Aamir Khan, all roll numbers which are multiple of 3 like Shahrukh Khan and all roll numbers which are multiple of 5 like Salman Khan. How many of these students does not like any of these three?
(a) 20 (b) 21
(c) 26 (d) 23

28. In a class of 50 students, 50 % of the students drink tea, 70 % of these drink coffee. If 30 % drink both tea and coffee then how many of these students does not take either of the two drinks?
(a) 10 (b) 5
(c) 3 (d) 1

Directions for 29 to 31: In a survey among 1200 bachelor women for their preferred characteristics in their 'would be husband' amo1ng these three categories: Money, Looks and Character, the following venn diagram can be made. The values of A, B and C are not known.



29. If the number of women preferring all the three characteristics is not more than mere 10%, then what can be the maximum number of women preferring Money and Character both in their "would be husband"?

(a) 100 (b) 240
(c) 180 (d) 120

30. If any single characteristic cannot have a total of more than 60% of preference by the total number of women surveyed, then what can be the minimum value of B?
(a) 110 (b) 120
(c) 100 (d) 0

31. What can be the maximum value of C, if more women preferred people having Money than Looks?
(a) 64 (b) 74
(c) 110 (d) 119

Directions for questions 32 to 34: There are 200 employees in an Office. 140 opt for Hot drink, 100 opt for Cold drink and all of them have at least opted for one of these two drinks.

32. How many of them opted for both the drinks?
(a) 60 (b) 80
(c) 40 (d) Cannot be determined

33. How many of them opted for Hot drinks only?
(a) 100 (b) 60
(c) 40 (d) Cannot be determined

34. How many of them opted for Cold drinks only?
(a) 100 (b) 60
(c) 40 (d) Cannot be determined

Directions for questions 35 to 37: There are 100 students in a college. 60 like Burgers, 40 like Pizzas and 20 of them don't like any of them.

35. How many of them like both Burgers and Pizzas?
(a) 20 (b) 40
(c) 10 (d) 30

36. How many of them like only Pizzas?
(a) 10 (b) 20
(c) 30 (d) 40

37. How many of them like only Burgers?
(a) 20 (b) 30
(c) 40 (d) 60

Directions for questions 38 to 41: A survey is conducted among 200 residents of a society. 100 like Movies, 120 like Shopping and 80 like Picnics. 60 residents like Movies and Shopping, 40 like Shopping and Picnics, 10 residents liked all the three and 20 residents did not like any of the three.

38. How many students liked at least two of the three?
(a) 90 (b) 100
(c) 120 (d) 80

39. How many residents liked only two of the three?
(a) 90 (b) 100
(c) 80 (d) 120

40. How many residents liked Movies and Shopping but not Picnics?
(a) 10 (b) 15
(c) 50 (d) 30

41. How many Residents liked only Shopping?
(a) 20 (b) 30
(c) 40 (d) 50

Directions for 42 to 44: A group of co-workers walked in a bar. 30% of them ordered Vodka, 25% of them ordered Rum and 60% of them ordered Beer. Only 10% people ordered both Vodka and Rum and all those who ordered Rum ordered Beer. Everyone among the group ordered at least one of these three items.

42. How many people ordered only Vodka?
(a) 12% (b) 20%
(c) 10% (d) Cannot be determined

43. What percent of People ordered only Rum and Beer?
(a) 10% (b) 5%
(c) 15% (d) Cannot be determined

44. If only 12% people ordered both Vodka and Beer only, then how many people ordered exactly one item?
(a) 31% (b) 33%
(c) 24% (d) None of these

Directions for 45 to 47 questions: Consider the following Venn Diagram. The diagram shows the number of people that like the three blockbuster movies of 2013. All the numbers are in thousands. A total of 1 lakh people were surveyed for the information. The values of A, B and C are not known.

45. If 50% of the total number of people who like Dhum 3 and 60% of people liked Krisssh 3, then find the value of A?
(a) 10 (b) 12
(c) 8 (d) None of these

46. If 35% of people liked exactly two of the three movies, then how many people liked only one of the three movies?
(a) 55000 (b) 63000
(c) 29000 (d) Cannot be determined

47. If A + B < C then what can be the minimum value of C ?
(a) 0 (b) 15
(c) 19 (d) None of these

Directions for 48 to 50 questions: In a movie theatre there were 150 people. There were three vendors at the theatre selling Popcorns, Drinks and Chips. After the movie ended, the vendors observed the following:

i. There were exactly 30 people who did not buy any of the three items.
ii. There were exactly 55 people who opted for neither Popcorns nor Drinks.
iii. There were exactly 25 people who bought all the three items.
iv. Each person bought only one quantity of any item. But can buy multiple items.
v. The total number of people who bought exactly one item is twice the number of people who bought at least 2 items.
vi. There were exactly 10 people who bought only Chips and Drinks both.

48. How many people bought exactly two of the three items?
(a) 10 (b) 12
(c) 15 (d) 25

49. How many people bought only Popcorns, if 10 people bought only Drinks?
(a) 15 (b) 20
(c) 25 (d) 10

50. If 92 people bought chips and 10 people bought only drinks, how many people did not buy Drinks?
(a) 72 (b) 92
(c) 87 (d) 67

■■■■

ANSWER KEYS

Chapter - 1

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

Chapter - 2

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

Chapter - 3

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

Chapter - 4

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

Chapter - 5

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

Chapter - 6

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

Chapter- 7

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

Chapter - 8

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

Chapter - 9

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

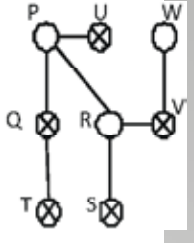
■■■■

SOLUTIONS CHAPTER - 1

1. B's mother's sister is B's Aunt. Aunt's daughter-in-laws's husband is her Aunt's son. Her Aun't son is his cousin.
2. B's father's wife is his mother. His mother's daughter is his sister. His sister's son is his nephew.
3. His father's father's(i.e. grandfather's) daughter-in-law can be his mother or aunt. So her son can be his brother or cousin. Hence cannot be determined.
4. Raju's sister's father is Raju's father. His father's wife is his mother. His mother's father-in-law is his grandfather. His grandfather's father's only grandson is his father. So Ramu is Raju's Father.
5. His daughter's husband is his son-in-law. His son-in-law's sister-in-law is his daughter. His daughter's mother is his wife.
6. B's father's only child is he himself. His son's aunt is his cousin.
7. Tanvi's mother's father-in-law is Tanvi's grandfather. Her grandfather's only granddaughter is she herself. And, hence Tanush is her brother.
8. D is C's only daughter-in-law.
   B is C's son. Hence, B is D's husband.
   A is B's sister-in-law. Hence A is D's sister.
9. Hema's father-in-law is Kallu.
   Rani is Hema's sister.
   Rani's sister's husband is her brother-in-law. Hence, Hema is Ramu's wife.
10. His sister's husband's father-in-law is his father. His father's only grandson's is his son. His son's father is he himself.
11. Ashish's mother's brother is his maternal uncle. His maternal uncle's daughter's brother is his cousin.
12. The only Daughter of lady's father is she her self. So the person is lady's son. i.e. is the lady is person's mothers.
13. B's maternal grandparents only son is his maternal uncle.
14. B's paternal uncle's sister is B's Aunt. B's Aunt's daughter is his cousin.
15. Kallu's grandparent's daughter-in-law can be his mother or aunt. Her son can be his cousin or brother. Hence cannot be determined.
16. Devesh's son's daughter-in-law is Devesh's granddaughter-in-law. His granddaughter-in-law's daughter is his great granddaughter. So he is Esha's great grandfather.
17. His daughter-in-law's husband is his son. His son's brother is also his son. His son's son is his grandson. His grandson's grandfather is he himself. So the person is his father.
18. His Aunt would be his father's sister.
    So his father would be his grandfather's son.
    So his father's father's son's sister is her Aunt.
19. His grandfather's only child is his father. His father's daughter-in-law could be his wife or his brother's wife. So, he could be her husband or brother-in-law.
20. His brother's father is his father. His father's only niece is his cousin.
21. There is one couple- Grandfather and Grandmother. They have three childrens (i.e. one daughter and two sons). One son has a wife. All the three children have one son.
22. B's son's son is B's grandson. B's grandson's brother is B's grandson who is A. So, B is A's grandfather.
23. (c) It is clear that E and C are sisters. Hence, B and E are sisters too.
24. Ram's sister's husband's father in law is Ram's father who is the brother of Aman. So, Aman's brother's only sibling is Aman. Aman's son is Ravi. So, Aman is father of Ravi.

Solution for 25 to 27:

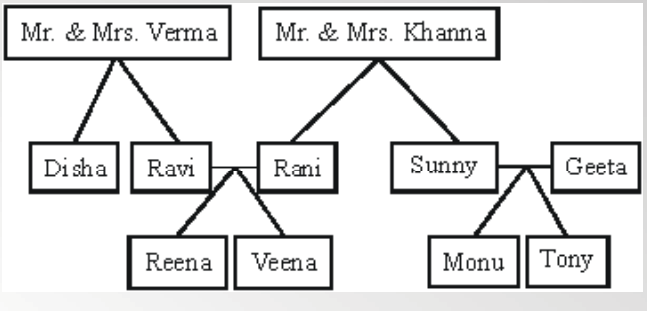
The family is as shown below:



Now all the questions can be answered easily.

25. (c)
26. (c)
27. (c)
28. As we don't whether A's father has how many brother's and whether his other brother has any daughter or not. Hence, cannot be determined.

Solution for 29 to 32: The family tree is as follows:



Now all the questions can be answered easily.

29. (b)
30. (c)
31. (c)
32. (b)
33. Raju's uncle's only sister is her aunty. Her aunt's daughter's only maternal aunt can only be his mother.
34. His father's brother's wife is his aunt. His aunt's only son's sister is his cousin. His cousin's only cousin brother is he himself. So, he is writing to his sister.
35. Consider two sisters are married to two brothers. One couple has 2 sons and one couple has 3 daughters. This completes the family and there are 9 members in the family.
36. P & Q means P is son of Q. Q @ R means Q is brother of R. R % S means, R is sister of S. S $ T means S is mother of T. So, P is son of Q who is the brother of S who is mother of T. So, P and T are cousins.
37. On solving we get that P is the grandmother of T.
38. On solving we get that P is the Cousin of T.
39. On going through the equations and solving them, we get that Z @ S % R @ N means that Z is the brother of N.
40. C is the mother of H.
41. Ramu is the Grandchild of Kallu as, Ramu's father's brother's wife's father in law is his grandfather. And his grandfather's parents only son is his grandfather. Hence, Ramu is the grandchild of Kallu.
42. Ruchi is Ragini's mother's brother's wife and at the same time, Ragini's father's sister. So, Ruchi is both her Maternal Aunt as well as Aunt.
43. Seeta is Mr. Venkat's daughter in law.
44. The brother sister pairs are: -
    (i) Sankat - Richa
    (ii) Richa - Sammy
    (iii) Ruchi - Richa's Husband
45. Ramu's daughter marries Ram's son, then Ram's grandson will be Ramu's daughter's son. Now, Ramu's son will call his sister's son his Nephew.
46. A's brother's wife's son's grandfather is A' father. His father's only daughter is she herself. Her son is B. So, A is B's mother.
47. Ramu's brother means his father. His father's father means his brother or he himself. His daughter means his sister. His sister's sister means his mother. So, Ramu is Rani's son.
48. Ramu's father is his son. His son's brother is he himself. His son is his brother.
49. Cannot be determined as the sex of Amrin is not known.
50. Rani's father's only grandson is Rani's father's grandson is her nephew. Her, nephew's only aunt his she herself. So, Rajesh's brother marries Rani. So, Rajesh will become Rani's brother in law.

■■■■

SOLUTIONS CHAPTER - 2

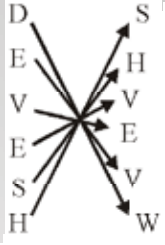
1. The logic here is that the first letter is forwarded 1 step, the second letter is forwarded 2 steps and so on.

$K \to L$
$A \to C$
$L \to O$
$L \to P$
$U \to Z$

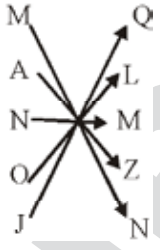
Hence, the code is LCOPZ

2. The positions of 1st and 3rd character (K and P) is reversed in the code. Hence, the positions of S and H will be reversed. Hence, option [b].

3. The first character is coded at the last place from the opposite direction in the alphabetical order.



Hence, MANOJ will be coded as



4. In this question the characters are written in reverse order.

Hence, S U S H I L will become L I H S U S. Hence, option [c].

5. The odd places are written 1 step backward and even places are written 1 step forward.

$N \to M$	$P \to Q$
$A \to Z$	$A \to Z$
$M \to L$	$R \to Q$
$A \to Z$	$T \to S$
$N \to M$	$H \to G$
	$I \to H$
	$V \to U$

6. The first character is written 1 step backward. The second character 2 steps backwards and so on.

$C \to B$ (1 step backward)
$H \to F$ (2 step backward)
$A \to X$ (3 step backward)
$M \to I$ (4 step backward)
$A \to V$ (5 step backward)
$N \to H$ (6 step backward)

7. The alternate characters of the word are interchanged to form the code. Hence, S R I L A N K A is R S L I N A A K.

8. The 1st and the 2nd characters are interchanged and so is the 4th and the 5th one.
So, N A D I A will become A N D A I.

9. The odd places characters are forwarded 1 step and the even places characters are backed 1 step.
Hence, C A M P U S will become D Z N O V R.

10. The code is written in reverse alphabetical order in reverse direction.
The reverse alphabetical order of MEHUL is NVSFO which is written in reverse order as OFSVN.
Hence, SMITA will become ZGRNH.

11. The alphabets are numbered from 1 to 26 in alphabetical order. Hence, A is 1, B is 2, …, Y is 25, Z is 26. The sum of the numbers of all the alphabets is the code.
Hence, KALLU = 11 + 1 + 12 + 12 + 21 = 57.

12. The alphabets are numbered from 1 to 26 in alphabetical order. Hence, A is 01, B is 02, …, Y is 25, Z is 26.
ZOOZLE is 26-15-15-26-12-05. The numbers are written in reverse order. So, the code is 05-12-26-15-15-26.
So, the code for GOOGLE will be 05-12-07-15-15-07.

13. The alphabets are numbered from 1 to 26 in reverse alphabetical order. Hence, A is 26, B is 25, …, Y is 2, Z is 1. So, VAIBHAV will become 5:26:18:25:19:26:5

14. The odd places alphabets are numbered from 0 to 25 in alphabetical order. Hence, A is 0, B is 01, …, Y is 24, Z is 25 and the even places alphabets are numbered from 2 to 26 in alphabetical order. Hence, A is 02, B is 03, …, Y is 26, Z is 27.
So, LANGRA will be coded as 130015061900.

15. The alphabets are numbered from 1 to 26 in alphabetical order. Hence, A is 01, B is 02, …, Y is 25, Z is 26.
The sum of the nos. of RAAM is 33 which is coded 30. The sum of the nos. of RAHIM is 50 which is coded 47.
Hence, the sum of the nos. of CRIST is 77 which will be coded 74.

16. 'GOD' is common in 'GOD IS GREAT', 'LOVE IS GOD' and 'GOD LOVE YOU' and so is 'RE'. Hence, code for 'GOD' is 'RE'
Similarly, the code for 'LOVE' is 'GA'. So, the remaining word in 'GOD LOVE YOU' is 'YOU' and the remaining code is 'PA'. Hence, the code for 'YOU' is 'PA'.

So, the code for I LOVE YOU is NI GA PA

17. From the given codes we can find that the code for CAMPUS = 12, LIFE =11, IS =13/14
So, the code for LIFE IS GOOD should have 11 and either 13 or 14.
Hence, the code can be either 11 13 15 or 11 15 14.
Hence, option [d].

18. From the given codes we can find that the code for
I = ^
GO = #
YOU = &
HATE = %
AND = *
So, the code for 'YOU GO I COME' can have '^&#' but cannot have '*'. So, the code is '^&#@'.

19. The alphabets are numbered from 1 to 26 and when the number crosses 9 the digits are added. So, A is 1, B is 2, Y is 2+5 = 7 and Z is 2 + 6 = 8.
So, the code for M = 1+3=4; A = 1; N = 1+4=5; O= 1+5=6; J = 1+0=1
Hence, the code for DEVESH = 454518

20. From the given codes we can find that the code for
lan = you
jan = will
van = there
can = do
Hence, the code for 'go' is 'pan'.

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

Now 16th from right is J & 6th to right of J is X

22. The order is as shown below:

Boy/Girl	G	B	G	B	G	B	G	B	G	B	G	B	G	B	G	B	G	B	G	B
Number	1	1	1	2	1	3	1	4	1	5	1	6	1	7	1	8	1	9	1	10
Position from left	1	2	3	5	6	9	10	14	15	20	21	27	28	35	36	44	45	54	55	65

The 30th person from the right is the 35th person from the left which is a boy. The 7th person to the left of 35th person is the 28th person from the left which is a girl.

23. Count only the number of OQ pairs occurring in the series.

24. go = a; to = p; j = school; stay = t; or = d;eat = w/s; play = s/w
So, code can contain tps or tpw.

25.

Days	Name
Sunday	Sunny
Monday	Baman
Tuesday	Rajan
Wednesday	Raman
Thursday	Naman
Friday	Sajan
Saturday	Diwakar

Hence, Raman and Baman plays on Wednesday and Monday.

26. $32 \times 4 + 14 \div 7 - 10 = 128 + 2 - 10 = 120$

27. The first three letters are reversed and the last two letters are reversed.

28. First letter + 1; Second letter - 1; Third letter - 1; Fourth letter + 1

29. The coding is as follows:-

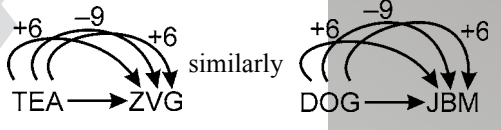
Letter	Code	Letter	Code
A+1	B	R+1	S
M+2	O	U+2	W
E+3	H	S+3	V
R+4	V	S+4	W
I+5	N	1+5	N
C+6	I	A+6	G
A+1	H		

30. tong pong is used in both the codes where am and I occurs. Hence, I can be coded as either tong or pong.

Solutions for 31 to 35:

A group of three characters/alphabets are formed and reversed. The same is followed till end. If at last two characters/alphabets are remaining it is also then reversed.

31. (d)
32. (c)
33. (b)
34. (c)
35. (c)



36. (b)
37. (c) letters are written from last to first
38. (c) $(2 + 4)^2 \rightarrow 36$ simlarly, $23 \rightarrow (2 + 3)^2 = 25$
39. (b) first number and middle number are written 1 2 2 3 4 $\rightarrow$ 12 simlarly 98765 $\rightarrow$ 97
40. (d) A + 13 $\rightarrow$ N, so M + 13 + Z
41. 41 + 24 / 6 × 5 - 4 = 41 + 20 - 4 = 41 + 16= 57
42. 400 ÷ 10 - 10 + 5 × 2 = 40 - 30 + 10 = 20
43. 20 + 30 - 10 × 10 ÷ 5 = 50 - 20 = 30. Hence, (a) is incorrect.
30 × 4 ÷ 12 + 5 - 2 = 10 + 3 = 13. Hence, (b) is incorrect.
45 ÷ 9 + 30 × 1 - 5 = 30. Hence, (c) is correct.
44. 200 ÷ 10 + 20 - 10 × 2 = 20 + 20 -20 = 20 which is correct.
Other options are incorrect hence only option (a) is correct
45. 140-40 + 100 ÷ 10 × 5 = 100 + 50=150. Hence,(d)
46. The odd numbered alphabets are written in opposite order as Z for A, Y for B and so on. The even number letters are added by the succession as 1st even no +

1, 2nd even number + 2 and so on.
Hence, STOLEN : HLUNVQ.

47. The odd numbered alphabets are written in opposite order as Z for A, Y for B and so on. The even number letters are added by the succession as 1st even no + 1, 2nd even number + 2 and so on.
Hence, FORBID : UPUDRG.

48. The odd numbered alphabets are written in opposite order as Z for A, Y for B and so on. The even number letters are added by the succession as 1st even no + 1, 2nd even number + 2 and so on.
Hence, AMERICA : ZNVTRFZ.

49. The odd numbered alphabets are written in opposite order as Z for A, Y for B and so on. The even number letters are added by the succession as 1st even no + 1, 2nd even number + 2 and so on.
Hence, AMSTERDAM : ZNHVVUWEN.

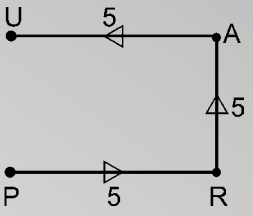
50. The odd numbered alphabets are written in opposite order as Z for A, Y for B and so on. The even number letters are added by the succession as 1st even no + 1, 2nd even number + 2 and so on.
Hence, PHONE : KILPV.

■■■■

SOLUTIONS CHAPTER - 3

1. X@B means B is 5m to the south of X. And B*Y means Y is 5m to the left of X. So Y is South-west of X.

2. M#N means M is to the West of N and N$T means T is to the North of N. Hence, T is the North-east of M.

3. 

   It is clear from the above diagram that U is in north of P.

4. The seating arrangement as per question is:

   R
   A P
   Q

   So, Q is to the South-east of R.

5. Since, the Sun rises in east and the shadow falls on the West. The shadow of Raj is to his right. Means he is facing south. So, Simran is facing North.

6. On drawing the direction graph, and turning the South-east towards north, we get that the west becomes South-east.

7. On taking a left and a right on facing West, he will again be facing West. So, all the other options are eliminated. Ans is (b).

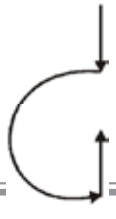
8. On facing east, he took a left and then a right turn. So He moved in the North-east direction from his house.

9. His speed = 6 × 1000/60=100m/min.
   He travelled 20 mins (2 km) East and 10 mins (1 km) North. So, by Pythagoras theorem, he was $\sqrt{5}kms$ away from his house.

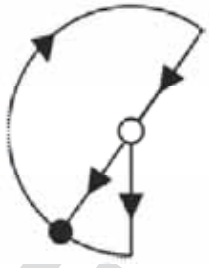
10. In morning, the Sun rises on East. Hence, shadow falls on the west. Since, Geeta's shadow was to the left of Seeta which is to the west, it means that Seeta is facing North.

11. East + 45° clockwise = South-East South-east + 90° clockwise = South-west South-west + 180° anticlockwise = North-east So, the man is facing in North-east direction.

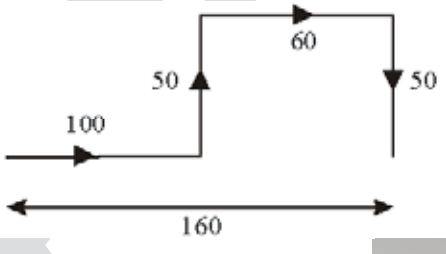
12. The flow of river is as shown in figure.



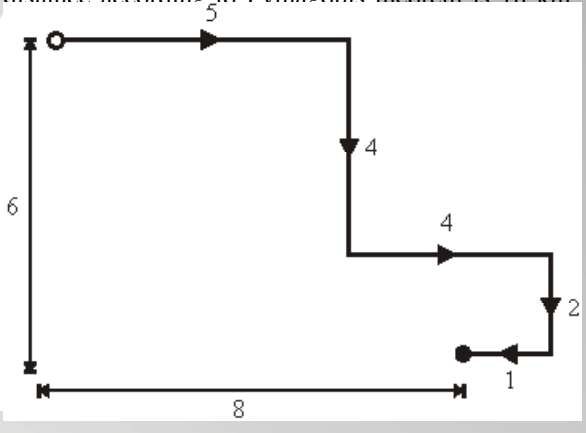
13. He goes down south and then turns towards his right, which means that he is then facing west. Then he travels along the boundary to a distance equal to five-eighths of the circumference. So, He is now facing south-east. On turning right he is facing south west and on reaching the opposite side, he is on the south-west direction of the originating point.



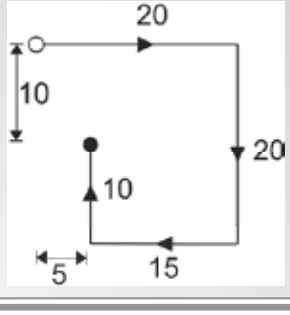
14. The man travels as shown in fig. So, he is 160 km away from the initial position.



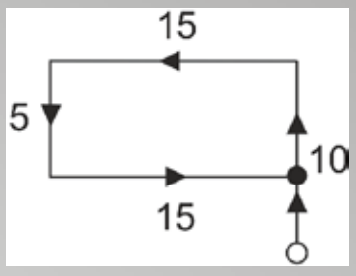
15. He is horizontally 8 km away from the starting point and vertically 6 km away from the starting point. So, total distance according to Pythagoras theorem is 10 km.



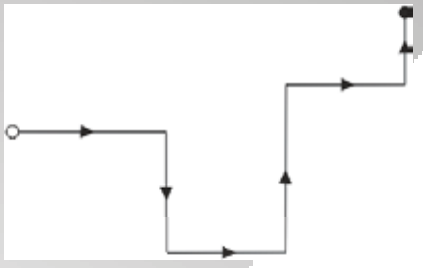
16. She is 5 m horizontally and 10 m vertically away from starting point. Hence, overall shortest distance is $5\sqrt{5}$ m.



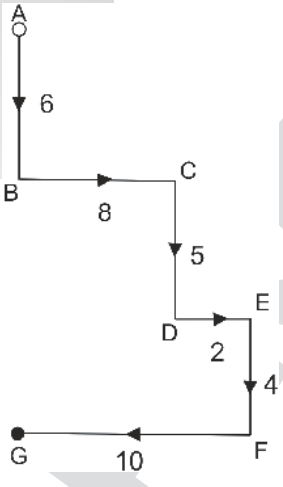
17. The horizontal distance is 0 km and the vertical distance is 5 km. Hence, the shortest distance is 5 km.



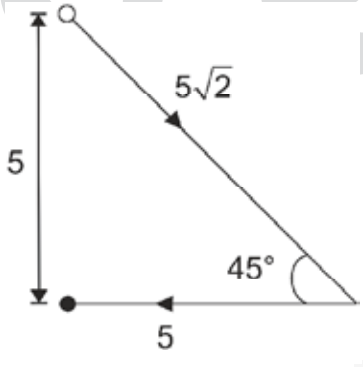
18. As per figure, the direction in which Hari is facing is North.



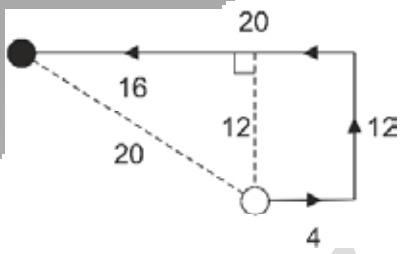
19. As per figure, the horizontal distance is 0 and vertical distance is 15. Hence, total distance is 15 m.



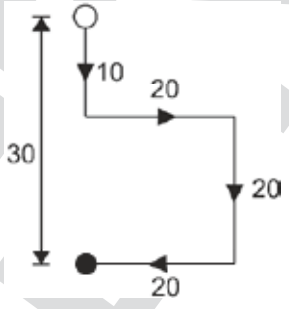
20. Applying Pythagoras theorem, we get that the distance between his village and his uncle's village is 5 km in the South direction.



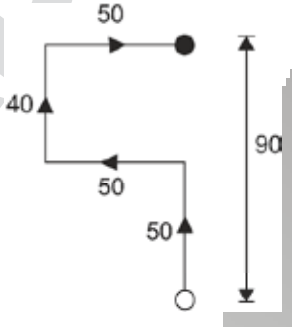
21. As per the figure, the vertical distance between the initial and final places is 12 and the horizontal distance is 16. So, as per Pythagoras theorem, the shortest distance is 20 km.



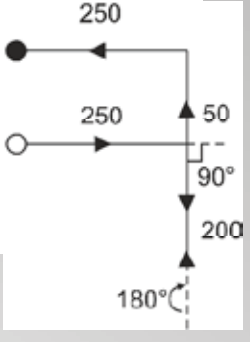
22. As per the figure, Shubham is 30 metres to the South of the starting point.



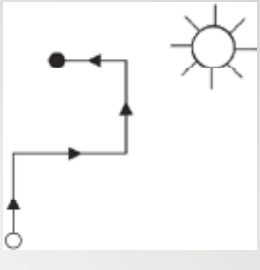
23. As per the figure, he is 90 metres from the initial starting point.



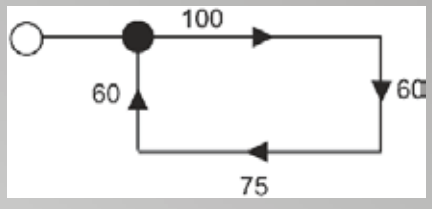
24. As per the figure, Ishwar is 50 meters to the North of the starting point.



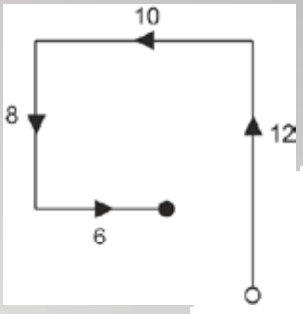
25. The sun shines on east in an early morning and Raghuvir was facing west at the end. Hence, the sun was shining on the back of Rughuvir.



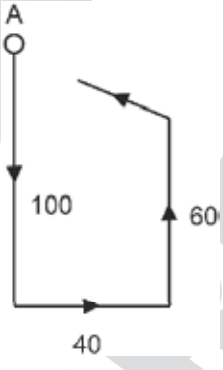
26. As per the figure, he is 25 metres away from the starting point.



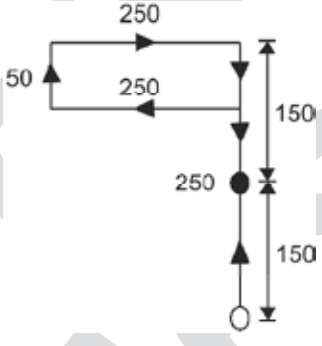
27. As per the figure, Tinkoo is to the North-west of the starting point.



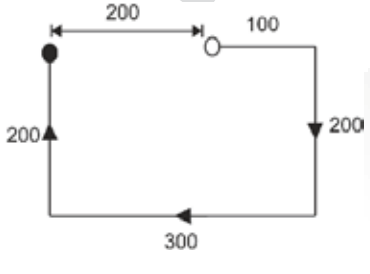
28. As per the figure, Rashmi is walking in the North-west direction.



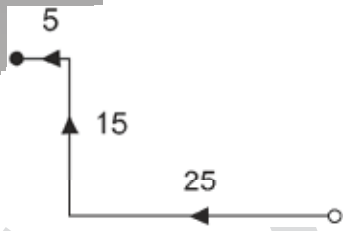
29. As per figure, Amit is 150 metres away from the starting point.



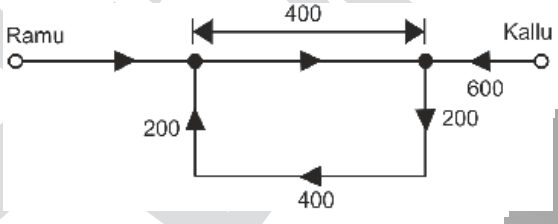
30. As per the figure, the boy met his girlfriend 200 metres from the starting point.



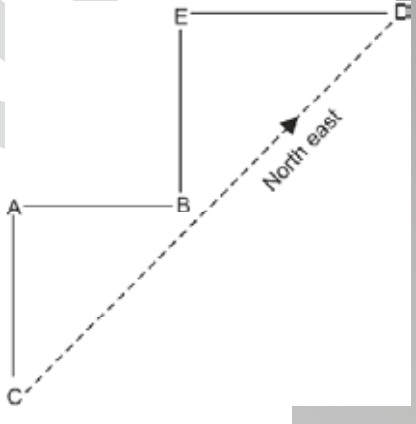
31. As per the figure, Arjun is to the North-west direction of the starting point.



32. As per the figure, Kallu has travelled the total distance of 1400 metres but has reached the halfway, i.e. 1 km, so Ramu has also covered the same distance in that time. So, he has reached 1400 m. So, the effective distance between them is 400 m.



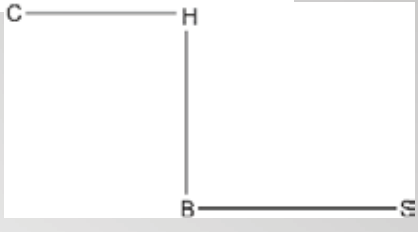
33. As per the figure, D is in North-east direction with respect to C.



34. According to Pythagoras theorem, QP = 50 m. Since, R is at the centre of Q and P, hence, RP = 25 m.

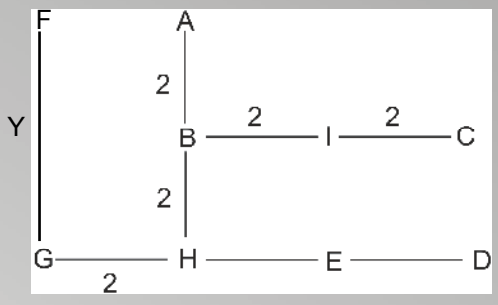
35. The order is: Raja Ram Roy Mohan John
So, Roy is third from the right end.

36. As per the figure, the college is to the north-west of the stadium.



37. The arrangement is as follows:
Sunanda Chanda Bipasha Eshwar Armaan Dhirendra
So, Eshwar is third to the right end.

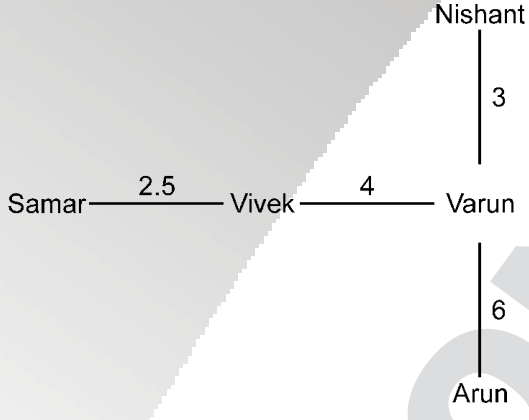
38. As per the figure, the distance between E and G is 4 km.



39. As per the figure, the distance between E and I is 2 km.

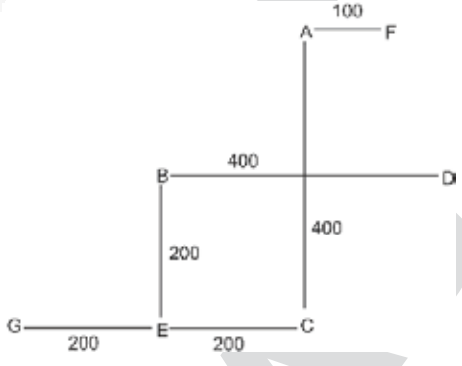
40. As per the figure, the distance between B and G is $2\sqrt{2}$ km.

41. As per the figure, Vivek to the left of Varun, and Nishant is to the north-east of Vivek.



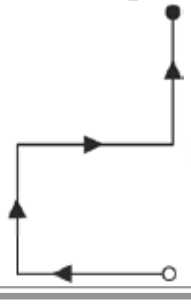
42. The boss has covered the distance = 2.5 + 4 + 3 = 9.5 metres.

43. As per the figure, the city G is to the south-west of city B.

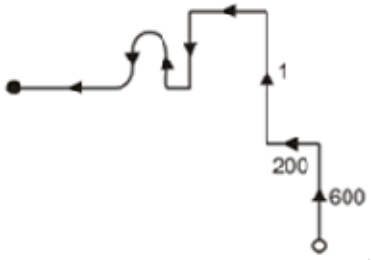


44. The total distance covered is 200 + 200 + 400 = 800 km.

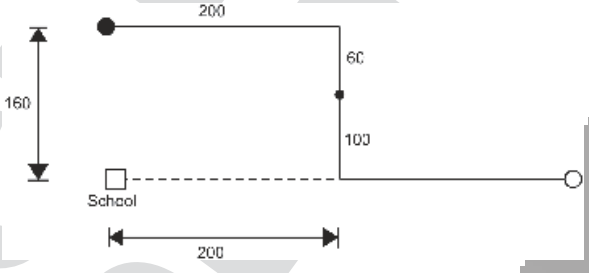
45. As per the figure, Ramesh's car was facing West when he left from his home.



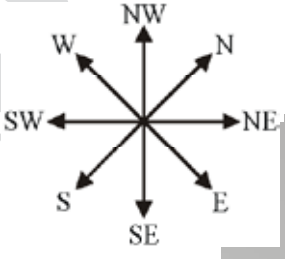
46. As per the figure, Arvind started his journey from the North direction.



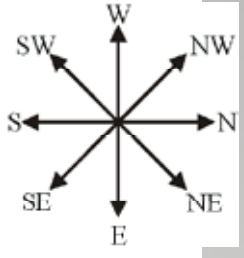
47. As per the figure, the peon was 160 metres away from the school.



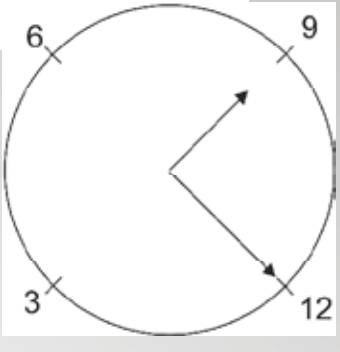
48. From the figure, South will be called south-east.



49. From the figure, the traveler was moving in North-west direction.



50. From the figure, it is clear that the minute hand is pointing towards south-east.



■■■■

SOLUTIONS CHAPTER - 4

1. Since the criteria (iv) is not fulfilled. Hence, the candidate will be rejected.
2. Criteria (iii) is not fulfilled and the information that will he be willing to pay Rs. 1 lakh is not given. Hence we cannot take a decision.
3. Information about the age is not given. So we cannot take a decision.
4. Criteria (i) is not fulfilled. Although he has cleared IAS phase 1. So, he will be referred to the Chairman of the company.
5. He has fulfilled all the criteria and hence, he will be selected.
6. Information about the Biology subject in class XII is not given. So, the decision cannot be taken.
7. He satisfies criteria (i), (ii) and (iv) but fails to satisfy criteria (iii). But he has scored more than 45% in interview. So, he will be referred to program co-ordinator.
8. She satisfies all the criteria. Hence, she will be selected.
9. Tunnu has less than 60% in XII but a reserved category student. So a relaxation is allowed.
   But he has scored less than 55% in written but more than 45 % in interview. So, he will be referred to program coordinator.
10. He satisfies the entire categories except (iii) but has scored more than 45% in interview. So, he will be referred to program coordinator.
11. He satisfies all the criteria for admission. Hence, he will be selected.
12. The stream of graduation is not known. Hence, we cannot take decision.
13. He does not fulfill the criteria (ii) although he has completed the Cost Accountancy course. So, he will be referred to the Dean.
14. He satisfies all the criteria for selection except criteria (vi), but is willing to pay Rs. 1,50,000 at the time of admission and remaining within three months. Hence, he will be referred to the Director.
15. He does not fulfill criteria (iv). Hence, he will not be selected.
16. She does not fulfill the criteria (ii) and also she does not have any additional qualification. Hence, she will be rejected.
17. She satisfies all the criteria. So, she will be admitted.
18. He satisfies all the criteria but no information is given about his class XII percentage.
    So, we cannot take a decision.
19. He satisfies all the criteria except (ii) but has done Chartered Accountancy. So, he will be referred to the Dean.
20. He satisfies all the criteria except (vi) but can pay Rs. 1,40,000 at the time of admission and remaining within 6 months. Hence, he will be referred to the Director.

Solutions for questions 21 to 30:

The conditions fulfilled by each candidate are tabulated below:

	Candi-dates	Cult. Land (acres)	Secu-rity		Unpaid		Crops in each land	FD in Bank (Rs. Laks)	Conditions Fulfilled						
									(i)						
	Man-meet	6	8	<50 <50	0		–	–	✓	–	✓	x	✓	–	✓
	Bhavesh	3	8	<50 <50	0		2	–	–	✓	✓	✓	✓	–	✓
©	Sujeet	4	8	? ?	0		1	6	x	x	✓	✓	✓	–	✓
©															
	Manmo-han	7	8+	<50 <50	0		–	–	✓	–	✓	✓	✓	–	✓

Solutions for questions 31 to 40:

A candidate of category F shall be selected with concession (A) if he is in the age group of 25-30 yrs. Similarly, a candidate of category S shall be selected with concession (B) if he has marks in the range : B.Sc - 55% to 60%, B.A.: 45% to 50% or B.Com. : 50% to 55%. Let us represent the general category other than F and S by G.

A candidate who has won award in a field other than Essay, Debate or Sports shall fulfill (C) and not (iii) and a candidate with family annual income more than Rs 1 lakh shall fulfill (D) and not (iv).

	Candi-dates	De-gree				An-ual Inc. (Rs.)			Conditions Fulfilled							
31. (e)	Rani	B.Sc.	66						x			–			–	
32. (b)	Neha		63					F	x			–			–	
33. (a)	Rama	B.A.	54					F				–			–	

Solution for questions 41 to 50:

	Candi-dates			Experi-ence in Mgmt. Dept.	Marks in PG		Exp. As Asst. Mngr.	Conditions Fulfilled						
									(i)					
(c) (e)	Renu	31	55	?	72	60	–	x	✓	✓	?	-	✓	✓
	Vikas	?	65	3	75	70	3	x	✓	?	x	✓	✓	✓
(b) (c)	Radhika	33	80	4	63	64	4	✓	-	✓	x	✓	✓	✓
(b)	Rajan	32	65	5	60	65	-	x	x	✓	✓	-	✓	x
(b) (c)	Varun	34	72	6	63	55	-	✓	-	✓	✓	-	✓	x

In question 48, the candidate will be rejected as one can be referred to only one person, but in this case Shubham is eligible to be reffered to General Manager as well as CEO, and hence will be rejected.

■■■■

SOLUTIONS CHAPTER - 5

Solutions for question 1-5

The logic here is that in every odd step the biggest alphabet is arranged to the last position and in even steps the smallest alphabet is arranged to the first position. The arrangement is done till all the words/alphabets are arranged in alphabetical order.

1. Input: alpha theta gamma lambda beta epsilon kappa pi
   Step I:alpha gamma lambda beta epsilon kappa pi theta
   Step II:alpha beta gamma lambda epsilon kappa pi theta
   StepIII:alpha beta gamma epsilon kappa lambda pi theta
   StepIV:alpha beta epsilon gamma kappa lambda pi theta
   This is the last step. Hence, the no. of steps required is 4.

2. Input: viper cobra krait python alligator crocodile gorilla
   Step I:cobra krait python alligator crocodile gorilla viper
   StepII:alligator cobra krait python crocodile gorilla viper
   Hence, option[c].

3. Input: Avash, Anant, Abhishek, Anwesha, Akhilesh, Amit, Amol, Amrindra
   Step I: Anant, Abhishek, Anwesha, Akhilesh, Amit, Amol, Amrindra, Avash
   Step II: Abhishek, Anant, Anwesha, Akhilesh, Amit, Amol, Amrindra, Avash
   Step III: Abhishek, Anant, Akhilesh, Amit, Amol, Amrindra, Anwesha,Avash
   The fifth position from left in Step 3 is Amol. Hence, option [d].

4. Input: A Story on how to manage your career and expectations
   Step I: A Story on how to manage career and expectations your
   Step II: A and Story on how to manage career expectations your
   Step III: A and Story on how manage career expectations to your
   Step IV: A and career Story on how manage expectations to your
   Step V: A and career on how manage expectations Story to your
   Step VI: A and career expectations on how manage Story to your
   Step VII: A and career expectations how manage on Story to your
   There are a total of 7 steps. Hence, option [c]

5. Input: Remember that there is always room at the top
   Step I: Remember that is always room at the there top
   Step II: always Remember that is room at the there top
   Step III:always Remember is room at that the there top
   Step IV: always at Remember is room that the there top
   Hence, option [c]

Solutions for questions 6-10.

The logic here is that in the odd steps the word starting with the letter that is smallest in the alphabetical order is arranged at the beginning and in even steps the word starting with the letter that is largest in the alphabetical order is arranged at the end so the that the final arrangement is in the order of alphabetical order of the starting letter.

6. Input: we shall overcome some day
   Step I: day we shall overcome some
   Step II: day shall overcome some we
   Step III: day overcome shall some we
   Hence, step III is the final step.

7. Since the words are arranged in alphabetical order of the starting characters in the final step. Hence, the last word will be "zid". Hence, option [c].

8. Input: main zindagi ka sath nibhata chala gaya
   Step I: chala main zindagi ka sath nibhata gaya
   Step II: chala main ka sath nibhata gaya zindagi
   Step III: chala gaya main ka sath nibhata zindagi
   Step IV: chala gaya main ka nibhata sath zindagi
   Step V: chala gaya ka main nibhata sath zindagi
   Hence, step V is the required output.

9. Input: zindagi zindadili ka naam hai
   Step I: hai zindagi zindadili ka naam
   Step II: hai zindadili ka naam zindagi
   Step III: hai ka zindadili naam zindagi
   The third word in step III is 'zindadili'. Hence, option [b]

10. Input: shahrukh aamir salman saif aayub khan
    The last step will be the alphabetical arrangement of words.
    Output: aamir aayub khan saif salman shahrukh
    Hence, option [d].

Solutions for questions 11-15

The logic of arrangement is that the last character of every word is considered for arrangement. The word with the smallest last character is arranged first and so on in increasing order in every step.

11. Input: Rahul Gandhi is son of Rajiv Gandhi
    Step I: of Rahul Gandhi is son Rajiv Gandhi
    Step II: of Gandhi Rahul is son Rajiv Gandhi
    Step III: of Gandhi Gandhi Rahul is son Rajiv

Step IV: of Gandhi Gandhi Rahul son is Rajiv
Hence, step IV is the last step.

12. Input: CSAT Chronicle is the best magazine for the preparation of IAS.
The output will be the words arranged in alphabetical order of the last character of each word.
Output: the the Chronicle magazine of preparation for IAS is CSAT best.
Hence, option [d] is the final output.

13. Input: Dr Manmohan Singh is the current prime minister of India.
Step I: India Dr Manmohan Singh is the current prime minister of.
Step II: India the Dr Manmohan Singh is current prime minister of.
Hence, the second word of the second step is 'the'.
Hence, option [c].

14. Input: Sonia Gandhi hail from Italy
The last word of the last step will the word having the last character as the biggest alphabet.
Hence, 'Italy' is the last word of the last step.

15. Input: Home Ministry is much more powerful than the Finance Ministry
Step I: Finance Home Ministry is much more powerful than the Ministry
Step II: Finance the Home Ministry is much more powerful than Ministry
Step III: Finance the Home more Ministry is much powerful than Ministry
Hence, option [c] is the required answer.

Solutions for questions 16-20.

The logic here is that in each step the words are arranged in the increasing order of no of characters in the words.

16. Input: I want to dance
Step I: I to want dance
This step is the last step. Hence, option [e]

17. Input: aaj phir jeene ki tamanna
The last step will be the increasing order of the no. of characters in the words.
Ouptut: ki aaj phir jeene tamanna
Hence, option [d]

18. Input: paper and pulp is importantly important
Step I: is paper and pulp importantly important
Step II: is and paper pulp importantly important
Step III: is and pulp paper importantly important
Step IV: is and pulp paper important importantly
Hence, step IV is the last step.

19. Input: Raj and Simran will always be remembered for their roles in a blockbuster film
The last step will be;
Output: a be in Raj and for will film their Simran roles always remembered blockbuster
The second word is 'be'. Hence, option [b].

20. Input: laptops have replaced computers in India
The last word will be the word having most no. of characters which is 'computers'. Hence, option [b].

Solutions for questions 21 to 25:

The arrangement rule is that in each step the number having the largest digit in ones place is arranged in the first place and so on till all the numbers get arranged.

21. INPUT: 524 632 781 987 253 458 129
STEP 1: 129 524 632 781 987 253 458
STEP 2: 129 458 524 632 781 987 253
STEP 3: 129 458 987 524 632 781 253
STEP 4: 129 458 987 524 253 632 781
This is the last step and hence the output.

22. INPUT: 412 528 654 313 789 986 217 510
STEP 1: 789 412 528 654 313 986 217 510
STEP 2: 789 528 412 654 313 986 217 510
STEP 3: 789 528 217 412 654 313 986 510
Hence, this is the step 3 for the given input.

23. Here, 879 is in the first place and 984 is in second place. So, the option where 984 is in first place and 879 not in first place will be the answer. Hence, (b).

24. INPUT: 744 841 849 123 475 987 650
STEP 1: 849 744 841 123 475 987 650
STEP 2: 849 987 744 841 123 475 650
STEP 3: 849 987 475 744 841 123 650
STEP 4: 849 987 475 744 123 841 650
Hence, there are 5 steps.

25. INPUT: 741 873 952 416 544 957
STEP 1: 957 741 873 952 416 544
STEP 2: 957 416 741 873 952 544
STEP 3: 957 416 544 741 873 952
STEP 4: 957 416 544 873 741 952
STEP 5: 957 416 544 873 952 741
Hence, there are 5 steps for the given input.

Solutions for questions 26 to 30:

The arrangement is based on the last character of each word. The arrangement shifts the word with alternating increasing and decreasing order of the last alphabets of the word.

26. INPUT: tra hrt btr tsd das arz can lay
The output will have the words arranged according to the last characters in alternating order of ascending and descending alphabetical orders.
OUTPUT: tra arz tsd lay can hrt btr das

27. INPUT: art ban cad cam mac far see gag
STEP 1: mac art ban cad cam far see gag
STEP 2: mac art cad ban cam far see gag
STEP 3: mac art cad far ban cam see gag
STEP 4: mac art cad far see ban cam gag
Hence, option (d) is the correct one.

28. STEP 1: maa bae tra tgv sdr dfg sdf vcb
The input will not have 'maa' in the first place. So, 'bae' will be at the first place.
Hence, option (c) is the correct one.

29. INPUT: riz trd msf man nab cal dog too sit

STEP 1: nab riz trd msf man cal dog too sit
STEP 2: nab riz trd sit msf man cal dog too
STEP 3: nab riz trd sit msf too man cal dog
STEP 4: nab riz trd sit msf too dog man cal
Hence there are only 4 steps for the given input.

30. INPUT: sat mar eav zac mop nob rog jol
STEP 1: nob sat mar eav zac mop rog jol
STEP 2: nob eav sat mar zac mop rog jol
STEP 3: nob eav zac sat mar mop rog jol
STEP 4: nob eav zac sat rog mar mop jol
STEP 5: nob eav zac sat rog mar jol mop
Hence, there are 5 steps.

Solutions for questions 31 to 35:

The arrangement rule is that the first item is the number with the largest number. The second item is the word with the starting alphabet in ascending alphabetical order. Then the second largest number and then the second word with starting alphabet in the ascending alphabetical order and so on till all the words/numbers are arranged.

31. INPUT: 71 gas 47 tag sad rat zag 12 65 85
The output will be:
OUTPUT: 85 gas 71 rat 65 sad 47 tag 12 zag

32. INPUT: raj gaj maj saj taj 12 13 14 15 16
STEP 1: 16 raj gaj maj saj taj 12 13 14 15
STEP 2: 16 gaj raj maj saj taj 12 13 14 15
STEP 3: 16 gaj 15 raj maj saj taj 12 13 14
STEP 4: 16 gaj 15 maj raj saj taj 12 13 14
STEP 5: 16 gaj 15 maj 14 raj saj taj 12 13
STEP 6: 16 gaj 15 maj 14 raj 13 saj taj 12
STEP 7: 16 gaj 15 maj 14 raj 13 saj 12 taj
Hence, there are 7 steps for the given input.

33. INPUT: east or west india rocks 15 08 19 47
STEP 1: 47 east or west india rocks 15 08 19
STEP 2: 47 east 19 or west india rocks 15 08
STEP 3: 47 east 19 india or west rocks 15 08
STEP 4: 47 east 19 india 15 or west rocks 08
Hence, option (b) is the correct answer.

34. INPUT: 25 jack and 15 bill went 75 hill
STEP 1: 75 25 jack and 15 bill went hill
STEP 2: 75 and 25 jack 15 bill went hill
STEP 3: 75 and 25 bill jack 15 went hill
STEP 4: 75 and 25 bill 15 jack went hill
STEP 5: 75 and 25 bill 15 hill jack went
Hence, there are 5 steps for the given input.

35. INPUT: twinkle 56 and 85 wrinkle 69 bright 47 stars
STEP 1: 85 twinkle 56 and wrinkle 69 bright 47 stars
STEP 2: 85 and twinkle 56 wrinkle 69 bright 47 stars
STEP 3: 85 and 69 twinkle 56 wrinkle bright 47 stars
STEP 4: 85 and 69 bright twinkle 56 wrinkle 47 stars
Hence, given step is the 4th step.

Solutions for questions 36 to 40:

The numbers are arranged according to the increasing value of the sum of the digits of the number. The point to note is that the numbers are not simply arranged. In each step, the numbers are replaced in position between the two.

36. INPUT: 359 451 202 650 131 475 984 698 365
STEP 1: 202 451 359 650 131 475 984 698 365
STEP 2: 202 131 359 650 451 475 984 698 365
STEP 3: 202 131 451 650 359 475 984 698 365
STEP 4: 202 131 451 650 365 475 984 698 359
STEP 5: 202 131 451 650 365 475 359 698 984
STEP 6: 202 131 451 650 365 475 359 984 698
This is the last step.

37. STEP 1: 132 456 154 124 415 215 474
The input must have any other number in place of 132 and 132 in place of that number. Other numbers will remain at the same place.
So, as per the given options, option (c) is the correct one.

38. INPUT: 149 497 151 546 541 651 355
STEP 1: 151 497 149 546 541 651 355
STEP 2: 151 541 149 546 497 651 355
STEP 3: 151 541 651 546 497 149 355
STEP 4: 151 541 651 355 497 149 546
STEP 5: 151 541 651 355 149 497 546
STEP 6: 151 541 651 355 149 546 497
Hence, there are 6 steps.

39. INPUT: 521 454 874 845 101 540 415
STEP 1: 101 454 874 845 521 540 415
STEP 2: 101 521 874 845 454 540 415
STEP 3: 101 521 540 845 454 874 415
STEP 4: 101 521 540 415 454 874 845
STEP 5: 101 521 540 415 454 845 874
Hence, there are 5 steps.

40. INPUT: 125 164 655 325 546 998 745
STEP 1: 125 325 655 164 546 998 745
STEP 2: 125 325 164 655 546 998 745
STEP 3: 125 325 164 546 655 998 745
Hence, the given step is the third step.

Solutions for questions 41 to 45:

In this case, the arrangement is done in the decreasing order of the units place of the number.

41. INPUT: 601 943 978 976 940 785 987
The last step will have the first number having the largest digit in units place and so on.
Hence,
OUTPUT: 978 987 976 785 943 601 940

42. STEP 1: 139 456 154 124 415 215 474
The INPUT will not have 139 in the first place and the first place will be filled with 456. Hence, option (b) is the correct one.

43. INPUT: 147 498 151 545 549 650 354

STEP 1: 549 147 498 151 545 650 354
STEP 2: 549 498 147 151 545 650 354
STEP 3: 549 498 147 545 151 650 354
STEP 4: 549 498 147 545 354 151 650
This is the last step. Hence, there are 4 steps.

44. INPUT: 521 454 876 845 109 540 417
STEP 1: 109 521 454 876 845 540 417
STEP 2: 109 417 521 454 876 845 540
STEP 3: 109 417 876 521 454 845 540
STEP 4: 109 417 876 845 521 454 540
STEP 5: 109 417 876 845 454 521 540
Hence, there are 5 steps.

45. INPUT: 698 654 301 520 687 549 155
STEP 1: 549 698 654 301 520 687 155
STEP 2: 549 698 687 654 301 520 155
Hence, the given step is the second step.

Solutions for questions 46 to 50:

This machine interchanges the first number with the number whose tens digit is the smallest. Then, the second number is interchanged by the number having second smallest tens digit and so on.

46. INPUT: 144 874 982 102 165 324 415 554
The last step will be the step having the numbers in the increasing order of tens digit.
OUTPUT: 102 415 324 144 554 165 874 982

47. STEP 1: 603 355 544 425 415 533 473 587
The input will not have 603 as the first number. The number in the first place will be some other number and 603 will be in that place. All other numbers remain at the same place.
From the option se get that option (b) is correct.

48. INPUT: 258 515 204 571 164 998 133 120
STEP 1: 204 515 258 571 164 998 133 120
STEP 2: 204 515 120 258 571 164 998 133
STEP 3: 204 515 120 133 258 571 164 998
STEP 4: 204 515 120 133 258 164 571 998
Hence, there are 4 steps.

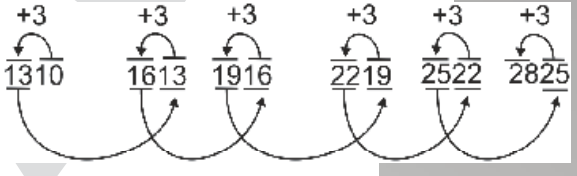
49. INPUT: 584 891 645 310 301 359 968 324
STEP 1: 301 891 645 310 584 359 968 324
STEP 2: 301 310 891 645 584 359 968 324
STEP 3: 301 310 324 891 645 584 359 968
STEP 4: 301 310 324 645 891 584 359 968
STEP 5: 301 310 324 645 359 584 891 968
STEP 6: 301 310 324 645 359 968 584 891
Hence, there are 6 steps.

50. INPUT: 145 320 491 984 351 100 661 977
STEP 1: 100 320 491 984 351 145 661 977
STEP 2: 100 320 145 984 351 491 661 977
STEP 3: 100 320 145 351 984 491 661 977
STEP 4: 100 320 145 351 661 491 984 977
Hence, the given step is step 4.

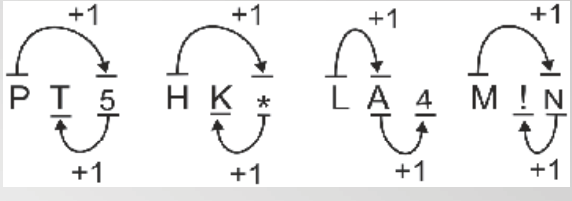
■■■■

SOLUTIONS CHAPTER - 6

1. The terms are in increasing powers of 2. Hence, next term is 32.
2. The terms are 1 - the squares of nos. The last term will be $5^2 - 1 = 24$.
3. The difference between the nos is increasing in a fashion of multiples of 2. The last term will have 10 as the difference. Hence, 30.
4. The last digit is 2. Only the first digit is getting multiplied by 2. Hence, the last term will be 162.
5. The nos. contain the squares of 3 consecutive nos. The second last term is the square of 3, 4 and 5. Hence the last term will be the squares of 4, 5 and 6 = 162536
6. The nos. are the result of multiplication of two consecutive nos. $110 = 10 \times 11$
   $156 = 12 \times 13$; $210 = 14 \times 15$; $272 = 16 \times 17$; Hence last term = $18 \times 19 = 342$.
7. $7 = 2^3 - 1$; $26 = 3^3 - 1$; $63 = 4^3 - 1$; $124 = 5^3 - 1$;
   Hence, last term = $6^3 - 1 = 215$.
8. 10; 15 = 10+5; 25 = 15+10; 40= 25+15; Hence, next term =40+20 = 60
9. The nos. are the cubes of two consecutive nos.
   $18 = 1^3 2^3$
   $2764 = 3^3 4^3$
   $125216 = 5^3 6^3$
   Next term = $7^3 8^3 = 343512$.
10. Each term contains three powers of a no.
    $248 = 2^1 2^2 2^3$.
    $3927 = 3^1 3^2 3^3$
    $41664 = 4^1 4^2 4^3$
    $525125 = 5^1 5^2 5^3$
    Next term = $6^1 6^2 6^3 = 636216$
11. $111 = 1^1 1^2 1^3$; $248 = 2^1 2^2 2^3$; $41664 = 4^1 4^2, 4^3$
    $525125 = 5^1 5^2 5^3$
    The 3rd term is not in the sequence.
12. The nos are three consecutive nos. But the fourth term contains the no already used in the previous term. Hence it is not in the series.
13. The nos. are consecutive terms of binary nos. except the last term. It should be replaced by 101.
14. The nos. are cubes of the no. + 1.
    $28 = 3^3 + 1$; $65 = 4^3 + 1$;
    The second term does not fit in this series.
15. The nos are in the form $a^1 b^2 c^3$. The third term is not fin the sequence. It should be replaced by 316125
16. The difference between two consecutive nos is increasing in a fashion of 2 except the 4th term.
17. The common difference is 50 in all except the first term.
18. The first digit is increasing by 1 and second digit is multiplied by 2. The 4th term is not satisfying the given condition.
19. The nos. are three consecutive odd nos. The third term has an even no in between.
20. Each no has three parts. The 2nd part and 1st part in all is 3 and that of 3rd and 2nd part is also 3. But in 252729 the difference is 2.
21. The series is as follows:

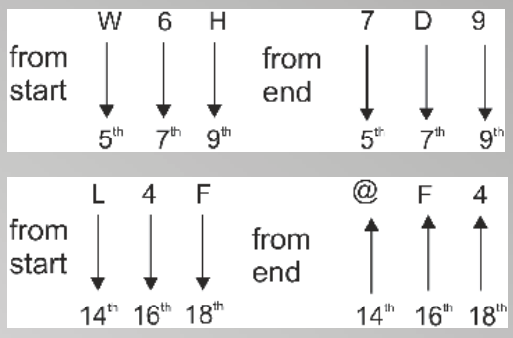


22. The series is the sum of the squares of the digits.
    $1^2 + 4^2 + 9^2 = 98$
    $9^2 + 8^2 = 145$
    $1^2 + 4^2 + 5^2 = 42$
    $4^2 + 2^2 = 20$
    Hence, the next term is 20.
23. W % 6 and Q < 1 are the two triplets that satisfy the given criteria. Hence there are two such symbols.
24. H and Q are the two symbols that are immediately followed and preceded by a symbol.
25. The relation is as shown below:



    So, LA4 is not in the group.
26. 3 P 5 T W 6 % H # K * 2 L & A 4 F % 0 M @ N X ! 9 8 D V 7 Q ? 1 <
    The only letter satisfying this condition is A. Hence, there is only one such letter.

27. The relation is shown below:

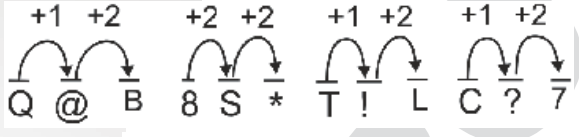


28. 3 P 5 T W % 6 # H * K 2 & L A 4 % F 0 @ M N ! X 9 8 D V 7 ? Q ≤ 1
The eliminated elements are underlined and shown above. There are 7 letters, 6 symbols and 3 numbers. So, the correct option is 6, 3 and 7.

29. Q @ 5 B % 8 & S 0 * R $ 4 T ! M L # 6 V ^ 1 C ? X 7 > Z G 3 < D
The symbols following the required criteria are shown above, Hence, there are 5 such symbols.

30. Q @ 5 B % 8 & S 0 * R $ 4 T ! M L # 6 V ^ 1 C ? X 7 > Z G 3 < D
There is only one such alphabet which is preceded and followed by a symbol.

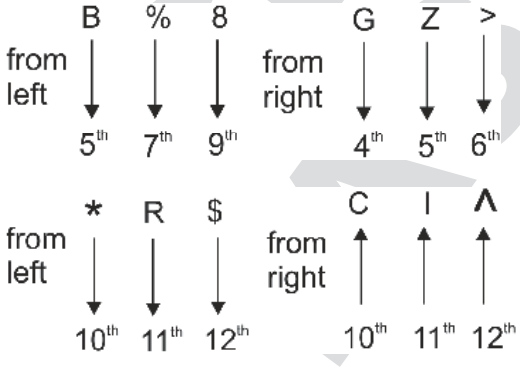
31. The relation is shown below:



As shown above, 8 S * is not in the same relation as the other three.

32. Q 5@ B 8 % S & 0 R * 4 $ T M ! L 6 # V 1 ^ C X ? 7 Z > G 3 D <
Hence, there are 4 such letters satisfying the number..

33. The relation is shown below:



34. Q @ 5 B % 8 & S 0 * R $ 4 T ! M L # 6 V ^ 1 C ? X 7 > Z G 3 < D
There are 5 symbols, 7 letters and 4 numbers that are eliminated.

35. $2 = 2^2 - 2$; $7 = 3^2 - 2$; $14 = 4^2 - 2$; $23 = 5^2 - 2$; $34 = 6^2 - 2$ So, $7^2 - 2 = 47$

36. $4 = 1^3 + 3$ $11 = 2^3 + 3$ $30 = 3^3 + 3$ $67 = 4^3 + 3$ $128 = 5^3 + 3$ So, $6^3 + 3 = 219$

37. The series is: $1(1+1)^2(1+2)^2$, $2(2+1)^2(2+2)^2$, $3(3+1)^2(3+2)^2$, $4(4+1)^2(4+2)^2$, $5(5+1)^2(5+2)^2$
= 53649

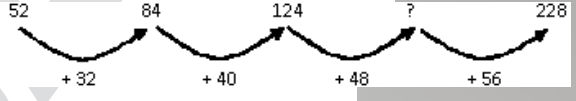
38. $4 = 3 + 1$, $7 = 3^2 - 2$, $30 = 3^3 + 3$, $77 = 3^4 - 4$, $248 = 3^5 + 5$, So, $248 = 3^6 - 6 = 723$

39. The first and the last digit add up to give the middle digits. The first digits are in increasing order and the last digit is also in increasing order by 1. Hence, the last term is 6148.

40. The first digit is in increasing order. The remaining digits is the square of the first digit + C, where c starts from 1 and increases by 1 in each term.
$310 = 3(3^2 + 1)$ $418 = 4(4^2 + 2)$ $528 = 5(5^2 + 3)$ $640 = 6(6^2 + 4)$ $754 = 7(7^2 + 5)$
So, $8(8^2 + 6) = 870$

41. The difference between two consecutive terms is the increasing order of square of consecutive numbers.

42. The series is shown below:



Hence, the missing term = 124 + 48 = 172.

43. The series is alternate consecutive prime numbers. So, the next to next prime number after 17 is 23 and the next to next prime number after 23 is 31. Hence, 23 is the required answer.

44. The series is consecutive prime numbers + 2. So, the next prime number after 45 is 47. So, the next term is 47 + 2 = 49.

45. The difference between the terms is as follows:
6 6 8 8 6 6.
So, the missing term is 39 + 8 = 47.

46. 31; 31×2 + 1= 63; 63 × 2 + 2 =128; 128 × 2 + 3 =259; 259 × 2 + 4 = 522

47. The first and the second alphabets are consecutive and the third one is the alternate alphabet to the second one.

48. a; c = a + 2; f = c + 3: ? = f + 4 = j; o = j + 5; u = o + 6

49. The number shows the difference between the two alphabets. Hence, the missing number is gp9.

50. 26 $77 = (26 \times 3) - 1$ $229 = (77 \times 3) - 2$, $684 = (229 \times 3) - 3$, $? = (684 \times 3) - 4 = 2048$, $6141 = (2048 \times 3) - 5$

■■■■

SOLUTIONS CHAPTER - 7

Solutions to Q. 1 & 2:

Sashi = Sanjeev + 5
Sashi = Amjad + 4
Hence, Amjad = Sanjeev + 1
Which gives Sashi > Amjad > Sanjeev
Now, Dharmendra = 2 × Amjad also it is given that Sanjeev cannot carry more than Amitabh.
Hence Sanjeev carries the least weight.

1. [a]
2. [c]
   If Sashi and Dharmendra carry equal weights then Amjad + 4 = 2 × Amjad
   Hence Amjad carries 4 kgs and therefor Sashi and Dharmendra carry 8 kgs each.
   Hence both of them together can carry 16 kgs in a single trip.
   Hence [c]

Solutions to Q. 3 to 7:

3. From statements II, III and IV we know that Deepika, Elena, Falguni, Chaya, Tarun and Utpal sit at the circular table and Prateek, Quadir, Arshy, Bindu, Roshan and Santosh sit at the rectangular table.
   Hence [d]
4. The exact positions of the husbands and the wives sitting at the circular table are not known.
   Hence [d]
5. Since the condition is given that Chaya sits to the right of Tarun and Falguni sits to his left, only one arrangement is possible in which Deepika sits to the left of falguni.
   Hence [b]
6. With the given data, the exact seating arrangement cannot be determined.
   Hence [d]
7. From the given data we have Roshan sitting to the left of Quadir.
   Hence [d]
8. The only possible solution is
   P/K C K/P M N P Hence [b]

Solutions to Q. 9 to 11:

(III) → Suhani takes the first lecture.

(II) → Falguni cannot deliver the fourth lecture.
Hence Chaya cannot deliver the second lecture.

(I), (IV) and (V) → Falguni, Ishita, Neha and Elena deliver lectures after Chaya.

Hence, Chaya can deliver the third or the fourth lecture.

If Chaya delivers the fourth lecture, there is no place for Deepika's lecture.

Hence, Chaya delivers the third lecture, Falguni delivers the fifth lecture, Deepika delivers the sixth lecture.

From (IV), Neha and Elena deliver the seventh and the eight lectures not necessarily in that order.

We get, from (IV) and (VI),

S M C I F D E/N N/E

Now all the questions can be answered.

9. [c]
10. [b]
11. [a]

Solutions to Q. 12 to 16:

From the given information the different possible arrangements are:

Boy		Girl	Boy	Girl	Boy	Girl	Boy	Girl	
D	P	B					M	1	
D		P	B				M	2	
D				P	B	M	3		

Or,

Girl	Boy	Girl	Boy	Girl	Boy	Girl	Boy
M	P	B				D	4
M			P	B		D	5

12. From the given condition statement 1 is true and the arrangement is:
    D P B N A/C O C/A M
    Hence [d]
13. From given condition statement 1 is true and the arrangement is:
    D P B N/O A/C O/N C/A M
    Hence [d]
14. If Dharmendra and Bobby are one seat away from each other the statement 1 and 5 is true.
    Hence [c]
15. If Priyanka and Mandakini are sitting on alternate seats

then statement 3 and 4 are true.
Hence [b]

16. D N/O A/C P B O/N C/A M Case I

M A/C P B O/N C/A N/O D Case II

(a) is true in case II but not in case I.

(b) is true only if Chetan (C) sits to the left of B in both the cases.

(c) is not true.

Hence [d]

17. E is sitting at seat 2.

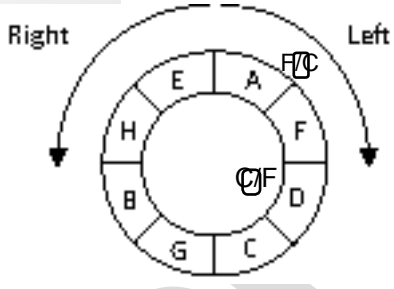
18. If C and P are on opposite sides, then P can sit only on seat no. 3. So, Q will sit on seat no. 7.

19. A and C can occupy seat no. 8. Hence, cannot be determined.

20. E and Q can sit adjacent to each other in 2 & 3; Option [a] eliminated.
A and P can also sit adjacent to each other in 6 & 7/ 8 & 7; Option [b] eliminated.
F and P can sit adjacent to each other in 4 & 3; Option [d] eliminated.
D and Q can never sit adjacent to each other. Hence, option [c].

Solutions for 21 to 24:

The seating arrangement is as follows.



21. Hence, (b)

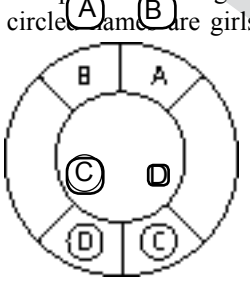
22. Hence, (c)

23. Hence, (b)

24. Hence, (c)

Solutions to questions 25 and 26:

The possible arrangement are as shown in fig. The circled names are girls.

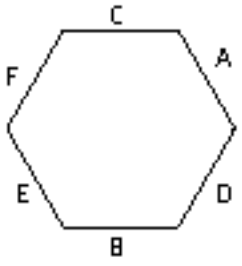


25. (b)

26. (a)

Solutions for 27 and 28

The seating arrangement is as shown in fig.



27. Hence, (c)

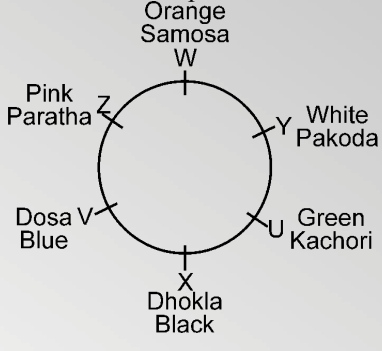
28. A is correct. B and D are incorrect. C is correct. Hence, (c)

Solutions for 29 to 33:

W orders for Dhokla and wears black Cap. The person opposite to W orders for Samosa. Now, the persons wearing orange Cap and pink Cap do not order for Pakoda, Dosa, Kachori or Dhokla. So, they order for Samosa or Paratha. But one who orders for Paratha is on the immediate right of the person in orange Cap. So, the person wearing orange cap, orders for Samosa while the person who orders for Paratha wears pink and is seated to the right of the person in orange-Cap

Now, the person who orders for Paratha is on the immediate left of the person who orders for Dosa. Clearly, the person to the left of the person in orange, orders for Pakoda. But he is opposite to the person wearing blue Caps. So, the persons who orders for Dosa, wears blue Caps. Now, the person who orders for Pakoda must wearing green or white. But a person with green Caps doesn't order for Pakoda. So, he wears re. Thus, the person who orders for Kachori wears green Cap.

The person who likes Samosa is the only person between Y and Z. But Z does not like Pakoda. So, Y orders for Pakoda and wears white Cap, while Z orders for Paratha and wears pink Cap. Now, U neither wears orange nor sits to the immediate left of X. So, U orders for Kachori and wears green Cap. W does not orders for Dosa. So, W orders for Samosa and wears orange Cap. Thus, V orders for Dosa and wears blue Cap.



29. W wears a orange Cap.

30. U is between Y and X, and U wears green Cap.

31. U orders for Kachori.

32. The correct combination is Y – white - Pakoda.

33. Z orders for Paratha and wears pink Cap.

Solutions for 34 to 36:

Gopal is to right of Deep and to the left of Boman i.e., Deep, Gopal, Boman. Amit is on the right of Chetan i.e. Chetan Amit.
Ehsan and Boman have two sprinters between them i.e. Ehsan, Deep, Gopal, Boman.
Amit and Deep have one sprinter between them i.e. Chetan, Amit, Ehsan, Deep, Gopal, Boman. Since Deep and Furkan have two sprinters between them, the arrangement from left to right in the line becomes :
Chetan, Amit, Ehsan, Deep, Gopal, Boman, Furkan.

34. Furkan is on the extreme right.

35. Depp is exactly in the middle.

36. Chetan is on the extreme left.

Solutions for 37 to 40:

V is the immediate right of Y i.e., Y, V.

W is between U and E i.e., U, W, Y, V.

Since X is not at the end and Z is not at the right end, so the sequence in the row becomes:

Z X U W Y V

37. There are four persons to the right of X- UWYV.

38. Clearly, Z is standing on one side while each one of V, W and Y is on other side of X.

39. U is to the immediate left of W.

40. V is at the right end.

Solutions for 41 to 45:

Chandu is to the right of Damodar.

Damodar is third from south. So, Baljeet will be at the extreme end from north because it should have Ehsan as its neighbour. Ganpat is between Ehsan and Fardeen. So, the sequence is:

Baljeet →
Ehsan →
Ganpat →
Fardeen →
Damodar →
Chandu →
Alok →

41. Ganpat is sitting to the right of Ehsan.

42. Alok and Baljeet are sitting at the extreme ends.

43. Ganpat should change place with Chandu to make it third from north.

44. Damodar is sitting between Chandu and Fardeen.

45. All the statements are required to determine the correct sequence.

Solutions for 46 and 47:

From (ii) and (iii) we get the following arrangement.

Qureshi ↑ North

Upendra ↓ South

Combining the above arrangement with the information in (iv), the arrangement becomes :

Qureshi	Tanush	Sandeep	↑ North
Upendra	Ravi	Parveen	↓ South

46. Qureshi and Praveen are diagonally opposite to each other, apart form Sandeep and Upendra.

47. Upendra, Ravi and Praveen get rooms in South direction.

Solutions for 48 and 50:

Ehsan is not at end. So, Ehsan must be in the middle of one of the row. Damodar is second to the left of Fukku. So, order of the row must be

Damodar _ Fukku

_ Ehsan Champak

Ballu is the neighbour of the Fukku.

so, the arrangement is :

Damodar Ballu Fukku

Amar Ehsan Champak

48. Other than Damodar and Champak (given), Amar and Fukku are sitting diagonally opposite to each other.

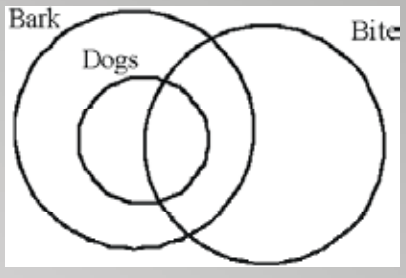
49. Clearly, from amongst the given altrenatives, Amar and Ehsan are in the same row.

50. Clearly, from amongst the given altrenatives, Damodar, Ballu and Fukku are in the same row.

■■■■

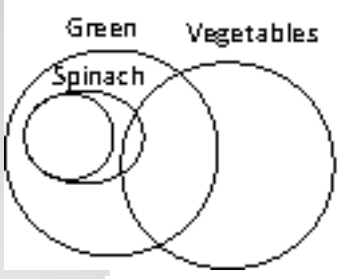
SOLUTIONS CHAPTER - 8

1. The Venn diagram representation is given below:



Hence, clearly, conclusion 1 follows but conclusion 2 may or may not follow. Hence, only (1) follows.

2. The Venn diagram representation is given below:



Hence, neither conclusion 1 nor conclusion 2 can be concluded. Hence, none of the conclusions follow.

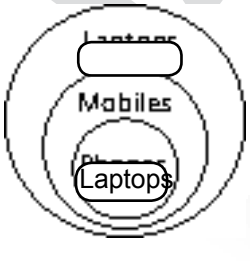
3. All boys play cricket. Some play carom. So, those who play carom must be playing cricket as well. Hence, conclusion 1 follows. Some boys play cricket only cannot be verified as all those playing cricket might be playing carom as well. Hence, conclusion 2 doesn't follow.

4. All tables are strong and some chairs are strong doesn't imply that all or any of the table is strong. Hence, none of the conclusion follows.

5. Some pens are pencils and some pencils are erasers, doesn't imply that any of the erasers are pens or not. It is also not specified that some erasers are not pencils. Hence, both the conclusions cannot be implied from the given information.

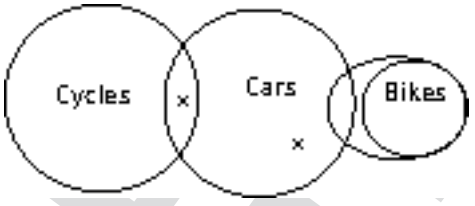
6. Some books are trees and some trees are girls, doesn't imply that some girls are books or some trees are not girls. Hence, none of the conclusions given follow.

7. The Venn diagram for the statement is shown below.



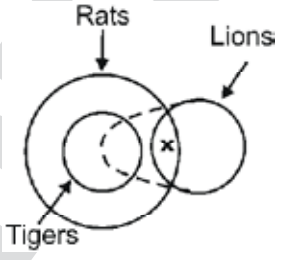
Hence, conclusion 1 follows but conclusion 2 doesn't follow.

8. The Venn diagram representation of the statements is given below:



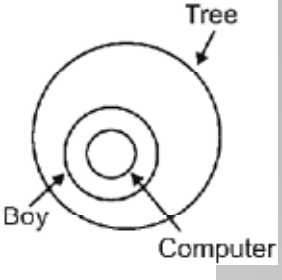
So, we cannot infer any of the conclusions given, as Bikes can or cannot be Cycles.

9. The Venn diagram representation of the statements is given below:



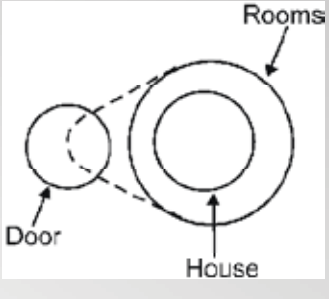
From the figure, it is clear that conclusion 1 and 2 can or cannot be true. Hence, none of the conclusions can be followed with certainty.

10. The Venn diagram representation of the statements is given below:



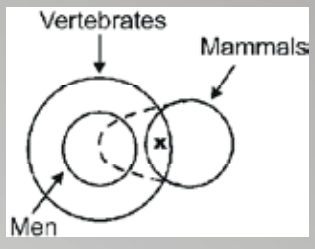
From the figure, it is clear that conclusion 1 is not true, but conclusion 2 follows. Hence, Only conclusion 2 follows.

11. The Venn diagram representation of the statements is given below:



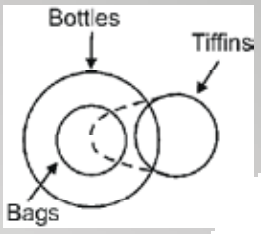
From the figure, it is clear that conclusion 3 is the only one that follows.

12. The Venn diagram representation of the statements is given below:



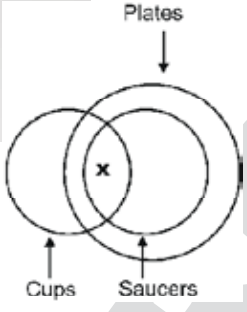
From the figure, it is clear that conclusion 4 is the only one that follows.

13. The Venn diagram representation of the statements is given below:



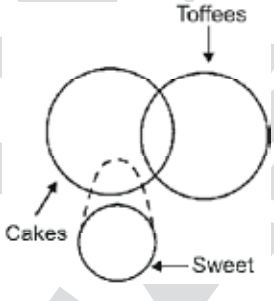
From the figure, it is clear that conclusion 3 is the only one that follows.

14. The Venn diagram representation of the statements is given below:



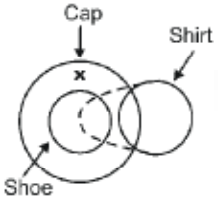
From the figure, it is clear that conclusion 1 is the only one that follows.

15. The Venn diagram representation of the statements is given below:



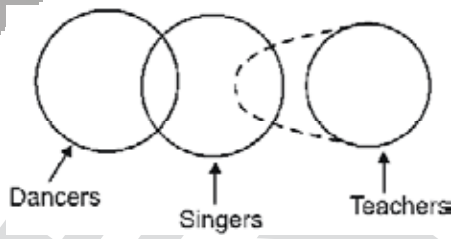
From the figure, it is clear that none of the conclusions follow.

16. The Venn diagram representation of the statements is given below:



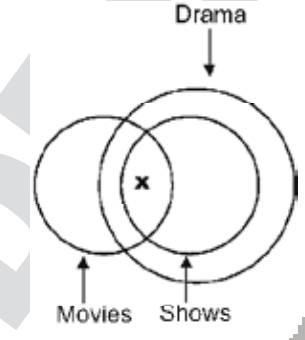
From the figure, it is clear that conclusion 2 is the only one that follows.

17. The Venn diagram representation of the statements is given below:



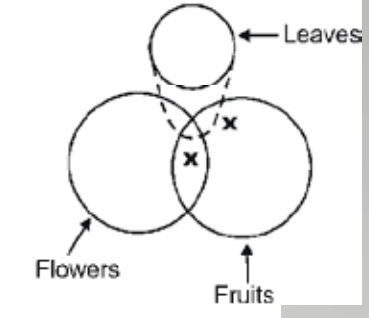
From the figure, it is clear that conclusion 1,2 and 4 are the only ones that follow.

18. The Venn diagram representation of the statements is given below:



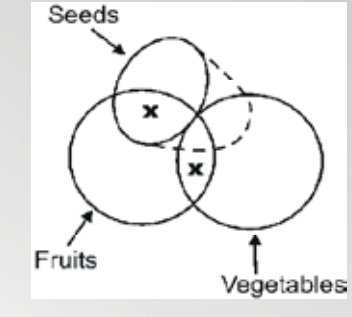
From the figure, it is clear that conclusion 1 and 3 are the only ones that follow.

19. The Venn diagram representation of the statements is given below:



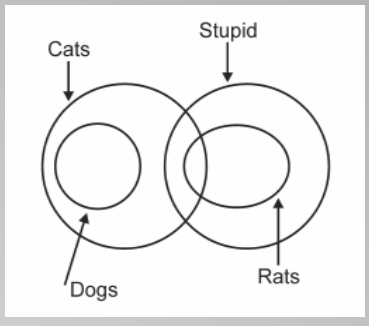
From the figure, it is clear that conclusion 3 and 4 are the only ones that follow.

20. The Venn diagram representation of the statements is given below:



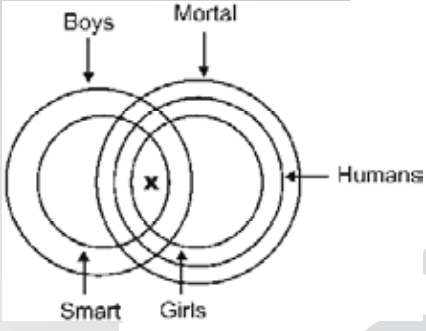
From the figure, it is clear that conclusion 3 and 4 are the only ones that follow.

21. The Venn diagram representation of the statements is given below:



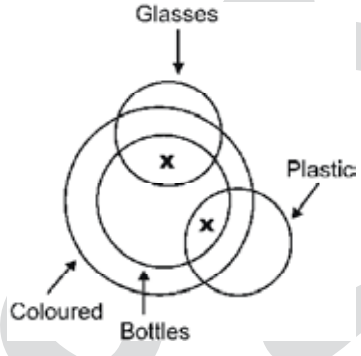
From the figure, it is clear that none of the conclusion is followed.

22. The Venn diagram representation of the statements is given below:



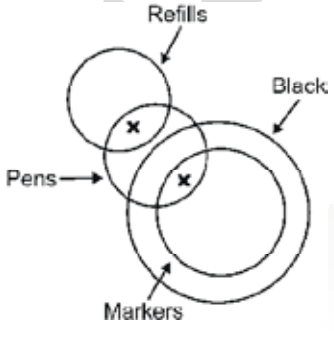
From the figure, it is clear that conclusion 1 is the only one that follows.

23. The Venn diagram representation of the statements is given below:



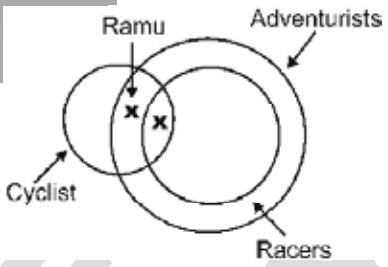
From the figure, it is clear that conclusion 1 is the only one that follows.

24. The Venn diagram representation of the statements is given below:



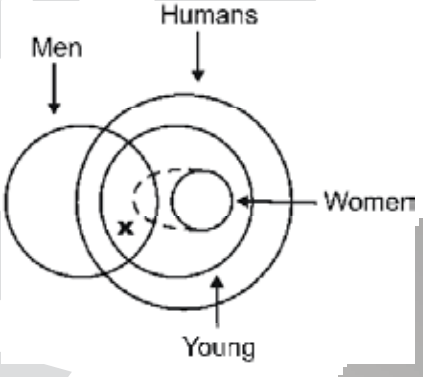
From the figure, it is clear that both conclusions follows.

25. The Venn diagram representation of the statements is given below:



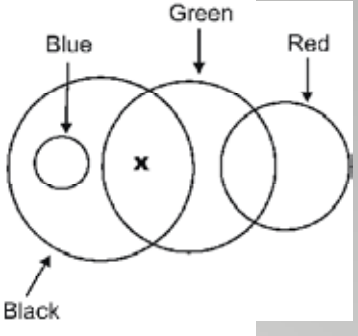
From the figure, it is clear that none of the conclusions follow.

26. The Venn diagram representation of the statements is given below:



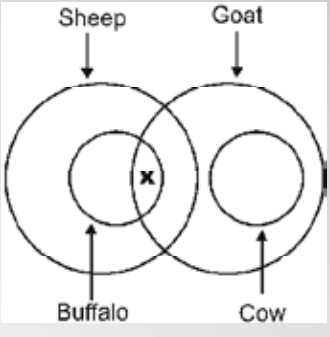
From the figure, it is clear that none of the conclusions follow.

27. The Venn diagram representation of the statements is given below:



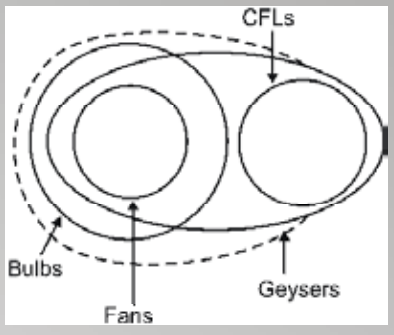
From the figure, it is clear that none of the conclusions follow.

28. The Venn diagram representation of the statements is given below:



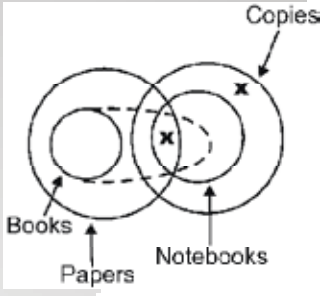
From the figure, it is clear that both conclusions 3 and 4 follow.

29. The Venn diagram representation of the statements is given below:



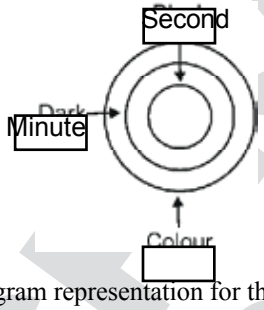
From the figure, it is clear that both conclusions 1 and 2 follow.

30. The Venn diagram representation of the statements is given below:

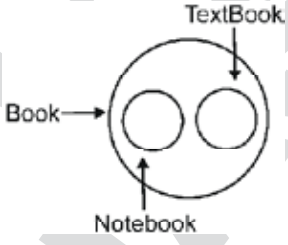


From the figure, it is clear that none of the conclusions follow.

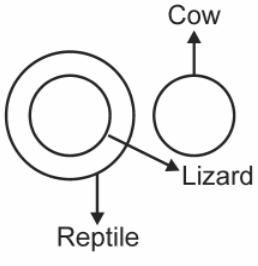
31. The Venn diagram representation for the words is given below:



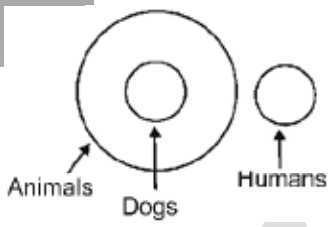
32. The Venn diagram representation for the words is given below:



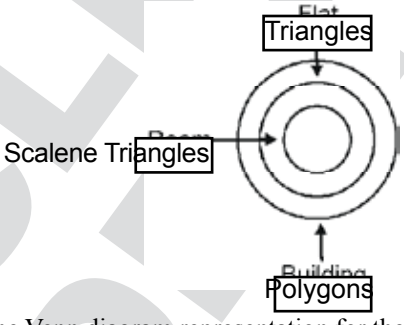
33. The Venn dia ords is given below:



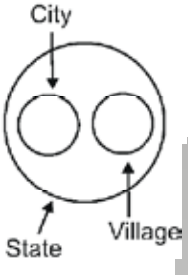
34. The Venn diagram representation for the words is given below:



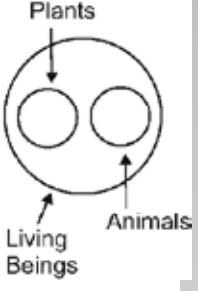
35. The Venn diagram representation for the words is given below:



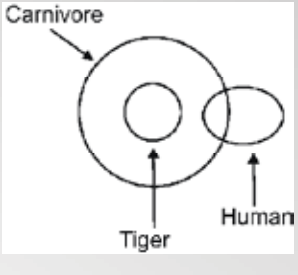
36. The Venn diagram representation for the words is given below:



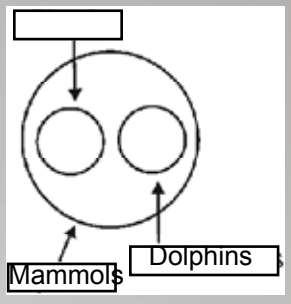
37. The Venn diagram representation for the words is given below:



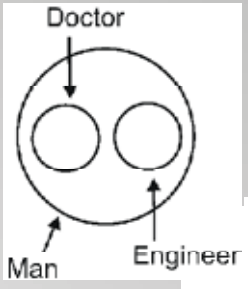
38. The Venn diagram representation for the words is given below:



39. The Venn diagram representation for the words is given below:



40. The Venn diagram representation for the words is given below:



41. In either - or statements, if any one of the condition is true then the other must be false.Here, Either Ram runs or he is not thirsty. So, if he runs, he is thirsty, or, if he doesn't run, he is not thirsty. Hence, conclusions 1 and 2 follow.

42. Clearly, conclusions 1 and 3 follow.

43. Conclusions 1, 2 and 3 cannot be inferred from the information given. Conclusion 4 follows clearly.

44. In this statement, if Humans eat, they rest, or, if humans don't eat, they don't rest. Hence, conclusions 3 and 4 follow.

45. In these types of questions, if A then B, the solution is always as B'A'. So, if Ramu doesn't eat Apple this means he doesn't walk. Hence, option (d) is correct.

46. If one should study then he should play games and if one shouldn't study, he shouldn't play games.
Hence, option (b) is correct.

47. If Ram doesn't go to a party he doesn't drink and if he goes to a party he drinks.
Hence, option (c) is correct.

48. If the phone is switched off it is ringing, or, if the phone is not switched off it is ringing.
Hence, option (c) is correct.

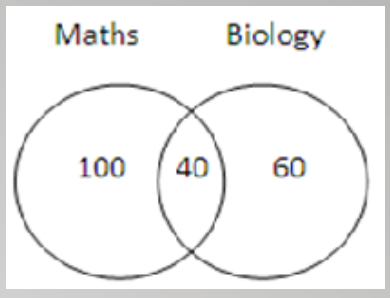
49. If it is not raining, then it is cloudy today, or, if it is raining then it is not cloudy today.
Hence, option (d) is correct.

50. If Pinku is far then I can see him, or, if Pinku is not far, then I can't see him. Hence, option (a) is correct.

■■■■

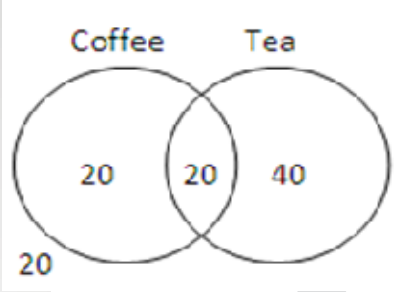
SOLUTIONS CHAPTER - 9

Solutions set for 1 to 3 :



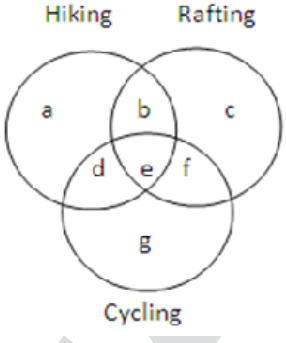
1. As per the Venn-diagram,
   There are 40 students who opted for both the subjects.
2. 100 of them opted for Maths only.
3. 60 of them opted for Biology only.

Solutions set for 4 to 6 :



4. As per the Venn-diagram,
   There are 20 employees that like Tea and Coffee both.
5. 20 of them like only coffee.
6. 40 of them like only tea.

Solutions set for 7 to 10 :



H = 100; 6R = 120; C = 80; H R = 60; R C = 40; HRC = 10

a + b + d + e = 100

b + c + e + f = 120

d + e + f + g = 80

a + b + c + d + e + f + g = 180

b + e = 60

e + f = 40

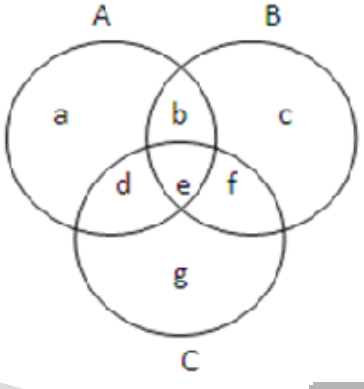
e = 10

From these equations we can find;

a = 20; b = 50; c = 30; d = 20; e = 10; f = 30; g = 20

7. At least any two = b + d + e + f = 110
8. Only two = b + d + f = 100
9. Hiking and Rafting but not cycling = b = 50
10. Only Rafting = c = 30

Solutions set for 11 to 13 :



A = 220; B = 200; C = 210; A B = 120; BC = 80; ABC = 20

a + b + d + e = 220

b + c + e + f = 200

d + e + f + g = 210

a + b + c + d + e + f + g = 400

b + e = 120

e + f = 80

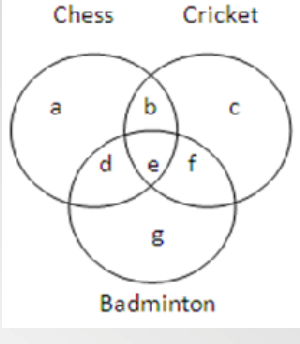
e = 20

From these equations we can find;

a = 70; b = 100; c = 20; d = 30; e = 20; f = 60; g=100

11. At least any two = b + d + e + f = 210
12. A and B but not C = b = 100
13. A only = a = 70

Solutions set for 14 to 17 :



Chess = 120; Cricket = 150; Badminton = 190;

Chess & Cricket = 80; Cricket & Badminton = 90; All = 30

a + b + d + e = 120

b + c + e + f = 150

d + e + f + g = 190

a + b + c + d + e + f + g = 270

b + e = 80

e + f = 90

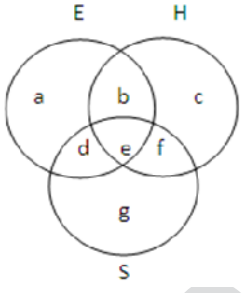
e = 30

From these equations we can find;

a = 30; b = 50; c = 10; d = 10; e = 30; f = 60; g = 90

14. At least any two = b + d + e + g = 180 = 60%.
15. Chess & Badminton but not cricket = d = 10
16. c : g = 1 : 9
17. Only two of three = b + d + f = 120 = 40%.

Solutions set for 18 to 20 :



E = 300; H = 240; E S = 120; HS = 60; E H = 80; All = 20

a + b + d + e = 300

b + c + e + f = 240

a + b + c + d + e + f + g = 500

d + e = 120

e + f = 60

b + e = 80

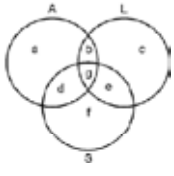
e = 20

From these equations we can find;

a = 120; b = 60; c = 120; d = 100; e = 20; f = 40; g = 40

18. No. of people speak Spanish = d + e + f + g = 200
19. No. of people that speak at least two languages = b + d + e + f = 220.
20. No. of people speaking Hindi and English only = b = 60.

Solutions set for 21 to 23 :



As per question,

a + f = 200

d = 50

a + c = 250

b = 25

c + f = 250

e = 25

$\Rightarrow$ a + f + a + c + f = 700

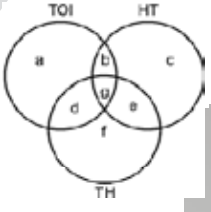
$\Rightarrow$ a + f + c = 350

$\Rightarrow$ f = 350 - 250 = 100

Also, a + b + c + d + e + f + g = 500 $\Rightarrow$ g = 50

21. So, no. of students in services = d + e + f + g = 50 + 25 + 50 + 100 = 225
22. No. of students specializing on all the three subjects = g = 50.
23. Either law or Administration = a + c + d + e = 100 + 150 = 250

Solutions set for 24 to 26 :



As per question,

a + b + d + g = 60

b + g + c + e = 50

d + g + e + F = 30

b + g = 20

d + g = 15

g + e = 10, g = 5

$\Rightarrow$ e = 5, d = 10, b = 15, F = 10, a = 30, c = 25

24. Hence, no. of people reading only one newspaper = a + c + F = 30 + 25 + 10 = 65
25. HT but not TH = b + c = 15 × 25 = 40
26. It is not known that any person does not read any newspaper so we cannot determine it.
27. Multiple of 2 = 50

Multiple of 3 = 33

Multiples of 5 = 20

Multiples of 2 and 3 = 16

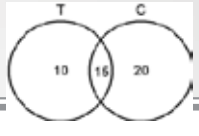
Multiples of 3 and 5 = 6

Multiples of 5 and 2 = 10

Numbers which are not multiple of 2, 3 or 5 be x.

Now, 100 = 50 + 33 + 20 – 16 – 6 × 10 + 3 + x

x = 26

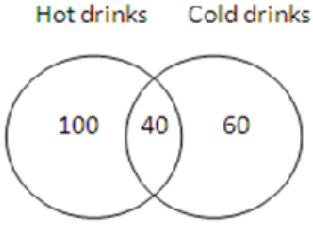


Tea = 25, Coffee = 35, Tea & Coffee = 15

So, total no. of students who does not like any of their = 50 - 45 = 5

29. As per information given, A = 10% of 1200 = 120. Then, B + C = 1200 – 1080 = 120. Value required by question = B + A. So, to maximize B + A, the value of B must be maximum possible. So, B can have the maximum value if C = 0. So, B (max) = 120. So, A + B can have the maximum possible value of 120 + 120 = 240.
30. A + B + C = 240
Total of Money = 240 + 230 + A + B = 470 + A + B. So, Max (A + B) = 720 – 470 = 250. But A + B + C = 240, so Max (A + B) = 240
Total of Looks = 230 + 350 + A + C = 580 + A + C. So, Max (A + C) = 140
So, Min(B) = 100.
31. Total of Money = 240 + 230 + A + B = 470 + A + B
Total of Looks = 230 + 350 + A + C = 580 + A + C
So, if Money > Looks, then, 470 + A + B > 580 + A + C
So, B > 110 + C
Also, A + B + C = 240, so for C to be maximum, A = 0, then B + C = 240 and B > 110 + C
So, B - C > 110 and B + C = 240
So, B > 175 and C < 65. So, max (C) = 64.

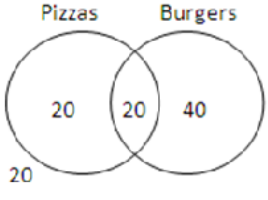
Solutions Set for 32 to 34 :



As per the Venn-diagram,

32. There are 40 employees who like both the drinks.
33. 100 of them like Hot drinks only.
34. 60 of them like Cold drinks only.

Solutions Set for 35 to 37

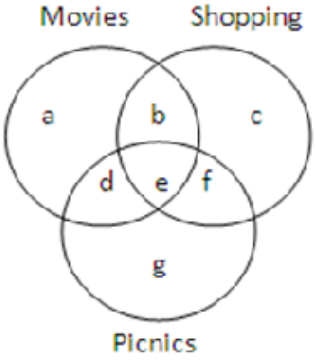


As per the Venn-diagram,

35. There are 20 students that like Burgers and Pizzas both.
36. 20 of them like only Pizzas.
37. 40 of them like only Burgers.

Solutions Set for 38 to 41 :

M = 100; S = 120; P = 80; MS = 60; S P = 40; MSP = 10



a + b + d + e = 100

b + c + e + f = 120

d + e + f + g = 80

a + b + c + d + e + f + g = 180

b + e = 60

e + f = 40

e = 10

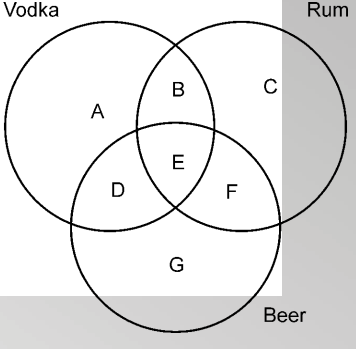
From these equations we can find;

a = 20; b = 50; c = 30; d = 20; e = 10; f = 30; g = 20

38. At least any two = b + d + e + g = 100
39. Only two = b + d + f = 90
40. Movies and Shopping but not Picnics = b = 20
41. Only Shopping = c = 30

Solutions Set for 42 to 44 :

Consider the following Venn diagram



42. A + B + D + E = 30%

B + C + E + F = 25%

D + E + F + G = 60%

Also, B = C = 0 as all those who ordered Rum also ordered Beer. So, there is no one who ordered Rum but didn't order Beer.

Also E = 10%

So, A + D = 20%

F = 15%

D + G = 35%

So, Only A cannot be calculated.

43. As per the given solution in previous question, F = 15%.

44. As per solution provided, A + D = 20% and D + G = 35%

Also, D = 12% (as per information in this question)

So, A = 8% and G = 23%.

So, exactly one item = A + C + G = 23 + 8 = 31%.

45. Total of Krisssh 3 = 12 + 26 + 9 + B = B + 47 = 60. So, B = 13

Total of Dhum 3 = 16 + 9 + B + C = 25 + B + C = 50

So, C = 25 – 13 = 12

So, A = 100 – (12 + 26 + 16 + 9 + 13 + 12) = 12.

46. Exactly 2 movies = 12 + 16 + B = 35

So, B = 8

Total = A + 12 + 26 + 16 + 9 + B + C = 100

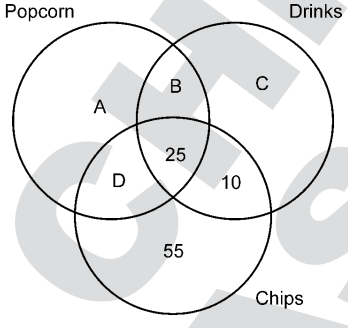
So, A + C = 100 – 71 = 29

Exactly one movie = A + 26 + C = 26 + 29 = 55.

47. A + B + C = 100 – 63 = 37

A + B < C, then C can have the least value of 19, so A + B will have value 18.

Solution set for 48 to 50 :



48. We can draw the following Venn diagram from the information available.

Exactly one item = 2(At least two items)

Total persons who bought at least one items = 150 – 30 = 120

So, Exactly one item = 2/3(At least one item) = 80

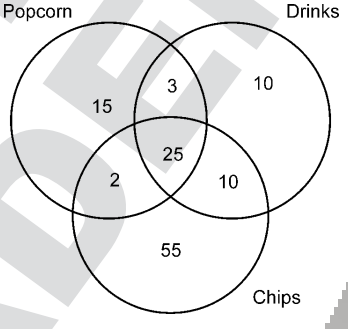
So, At least two items = 40

Exactly two items = 40 – 25 = 15.

49. As per previous question, exactly one item = 80

So, only Popcorns = 80 – Only Drinks – Only Chips = 80

50. The Venn diagram for the information available is as follows:



So, number of people who did not buy Drinks = 55 + 2 + 15 = 72. Hence, (a)

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