LOGICAL REASONING

SESSION – 1

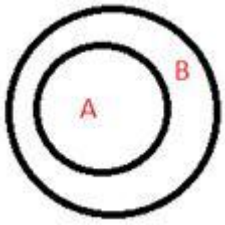
SYLLOGISM

Syllogism is a verbal reasoning type problem in which a conclusion is drawn from two given or assumed propositions (premises); a common or middle term is present in the two premises but not in the conclusion.

The best method of solving the Syllogism's problem is through Venn Diagrams. There are four ways in which the relationship could be made.

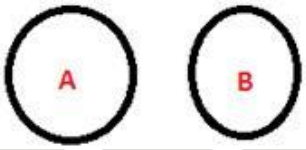
Category 1

All A are B – Means the whole circle representing A lies within the circle representing B.



Category 2

No A is B – means that circles representing A and B does not intersect at all.

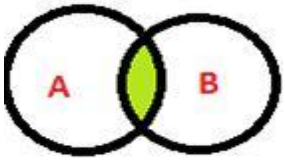


Example: No chair is a table.

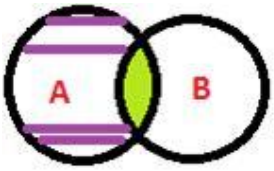
Category 3

Some A are B

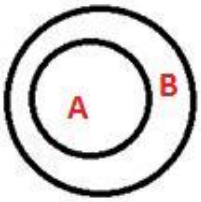
Means that some part of the circle represented by A is within the circle represented by B.



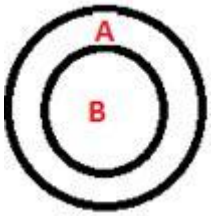
(i) Some A are B, also indicates that – Some A are not B



(ii) Some A are B also indicates that – All A are B.

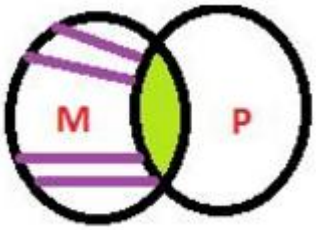


(iii) Some A are B also indicates that – All B are A.

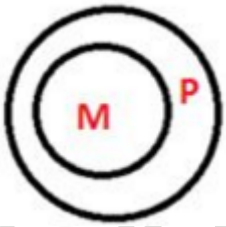


For e.g.: Some mangoes are pears.

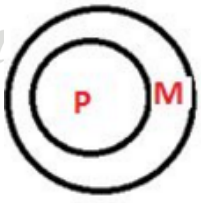
(i)



(ii)



(iii)

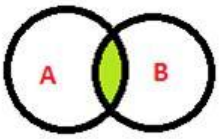


Category 4.

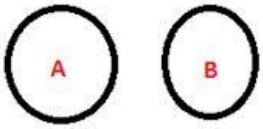
Some A are not B

Means that some portion of circle A has no intersection with circle B while the remaining portion of circle A is uncertain whether this portion touches B or not.

(i) Some A are not B also indicates that – Some A are B.



(ii) Some A are not B also indicates that – No A is B.



Complementary Pairs: (Either & or) – Either and or cases only take place in complementary pairs.

Conclusions: (i) Some A are B.

(ii) No A are B.

From the given above conclusions, it is easy to understand that one of the given conclusions must be true, which is represented by option either (i) or (ii).

These types of pairs are called complementary pairs.

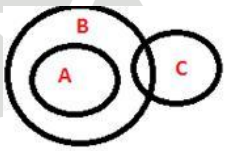
Note: 'All A are B' & 'Some A are not B' are also complementary pairs.

It is important to note that, in complementary pairs, one of the two conclusions is true and other will be false simultaneously.

For example –

Statement: All A are B. Some B are C.

Conclusion: I. All C are A. II. Some C are not A.



Here we can make conclusion, either I or either II follows.

Possibility cases in Syllogism – In possibilities cases, we have to create all possibilities to find whether the given conclusion is possible or not. If it is possible and satisfies the given statement then given conclusion will follow otherwise conclusion will not follow.

Exercises:

Directions for Q1 and Q2: State whether the given conclusion is **True or False**:

1. **Statement:**
   1. All A are B.
   2. Some B are C.

   Conclusion:

   All A being C is a possibility.

   (a) True (b) False

2. **Statements:**
   1. Some mouse is cat.
   2. All mouse are pets.
   3. No pet is animal.

   Conclusions:

   All mouse being animal is a possibility.

   (a) True (b) False

Directions for Q3 to Q17: Which of these is **a logical conclusion.**

3. **Statements:**
   1. Some Red Boxes are Green Boxes.
   2. All Red Boxes are Yellow Boxes.

   Conclusions:

   I. Some Yellow Boxes are Green Boxes.

   II. All Green Boxes are Red Boxes.

   (a) Only I can be true always

   (b) Only II can be true always

   (c) Both I and II can be true always

   (d) Both I and II cannot be true always

4. **Statement:**
   1. No animals are plants.
   2. All sheep are animals.

   Therefore,

   (a) All sheep are plants.

   (b) All animals are sheep.

   (c) Some Sheep Are Plants.

   (d) None of the above.

5. **Statements:**
   1. Some actors are singers.
   2. All the singers are dancers.

   Conclusions:

   I . Some actors are dancers.

   II. No singer is actor.

   (a) Only I conclusion follows

   (b) Only II conclusion follows

   (c) Either I or II follows

   (d) Neither I nor II follows

   (e) Both I and II follow

6. **Statements:**
   1. All states are towns.
   2. Some villages are not towns

   Conclusion:

   I. All states are villages

   II. Some states are villages

   III. Some villages are not states

   IV. Some states are not villages

(a) None follows
(b) Only III
(c) Only II and III follows
(d) All follows

7. **Statements:**
1. Some mangoes are yellow.
2. Some tixo are mangoes.
Conclusions:
I. Some mangoes are green.
II. Tixo is yellow.
(a) Only I conclusion follows
(b) Only II conclusion follows
(c) Either I or II follows
(d) Neither I nor II follows
(e) Both I and II follow

8. **Statements:**
1. All the trucks are flies.
2. Some scooters are flies.
Conclusions:
I. All the trucks are scooters.
II. Some scooters are trucks.
(a) Only I conclusion follows
(b) Only II conclusion follows
(c) Either I or II follows
(d) Neither I nor II follows
(e) Both I and II follow

9. **Statements:**
1. All the books are pencils.
2. No pencil is eraser.
Conclusions:
I. All the pencils are books.
II. Some erasers are books.
III. No book is eraser.
IV. Some books are erasers.
(a) Only III
(b) Only I and III
(c) Only I and II
(d) Only II and III
(e) Only III and IV

10. **Statements:**
1. No man is sky.
2. No sky is road.
3. Some men are roads
Conclusions:
I. No road is man
II. No road is sky
III. Some skies are men
IV. All roads are men
(a) Only I and III follow.
(b) Only II and III follow.
(c) Only II and IV follow.
(d) Only II follows.

11. **Statements:**
1. All players are spectators.
2. Some spectators are theatres.
3. Some theatres are dramas
Conclusions:
I. Some dramas are spectators
II. Some players are dramas
III. Some theatres are players.
IV. All spectators are players
(a) Only I and III follow.
(b) Only II and III follow.
(c) Only II and IV follow.
(d) None follows.

12. **Statements:**
1. All the papers are books.
2. All the bags are books.
3. Some purses are bags.
Conclusions:
I. Some papers are bags.
II. Some books are papers.
III. Some books are purses.
(a) Only I (b) Only II and III
(c) Only I and II (d) Only I and III

13. **Statements:**
1. Some trains are cars
2. All cars are branches
3. All branches are nets
4. Some nets are dresses
Conclusions:
I. Some dresses are cars
II. Some nets are trains
III. Some branches are trains
IV. Some dresses are trains
(a) Only I and III follow.
(b) Only II and III follow.
(c) Only II and IV follow.
(d) All follow.

14. Some jackfruits are lilies.
1. No lily is a canoe.
2. All canoes are oceans.
Conclusions:
I. Some jackfruits are oceans.
II. Some oceans are canoes.
III. Some oceans are jackfruits.
IV. Some lilies are jackfruits.
(a) Only I and III follow.
(b) Only II and III follow.
(c) Only II and IV follow.
(d) All follow.

15. **Statements:**
1. Only stars are moons.
2. No galaxy is a star.
3. No planets are moons.
Conclusions:
I. Some moons are not planets
II. No moon is a galaxy.
III. No galaxy is a planet.
IV. No stars are planets.
(a) I, II and IV follow
(b) I, III and IV follow
(c) II, III and IV follow
(d) III and IV follow
(e) I and II follow

16. **Statements:**
1. No navies are air forces.
2. All armies are navies.
3. All air forces are combats.
Conclusions:
I. No air forces are navies
II. Some combats are air forces
III. Some combats are not navies
IV. No armies are air forces
(a) Only either I or II follows
(b) Only II follows
(c) Only either I or IV follows
(d) All follows
(e) None follows

17. **Statements:**
1. All petals are flowers. Some flowers are buds.
2. Some buds are leaves. All leaves are plants
Conclusions:
I. Some petals are not buds
II. Some flowers are plants
III. No flower is plant
(a) Only I and II follow
(b) Either II or III follows
(c) Only I follows
(d) I and III follows
(e) I, II and III follow

Directions for Q18 and Q19: Each question contains six statements followed by four sets of combinations of three. Choose the set in **which the statements are most logically related**.

18. A. All roses are fragrant.
B. All roses are majestic.
C. All roses are plants.
D. All roses need air.
E. All plants need air.
F. All plants need water.
(a) CED (b) ACB
(c) BDC (d) CFE

19. A. Some mammals are carnivores.
B. All whales are mammals.
C. All whales are aquatic animals.
D. All whales are carnivores.
E. Some aquatic animals are mammals.
F. Some mammals are whales.
(a) ADF (b) ABC
(c) AEF (d) BCE

20. The below question consists of six statements followed by options consisting of three statements put together in a specific order. Choose the option, where the third statement is a conclusion drawn from preceding two statements.
A. Six is five.
B. Five is not four.
C. Some five is ten.
D. Some six is twelve.
E. Some twelve is five.
F. Some ten is four.
(a) ABC (b) ADE
(c) AEF (d) EDC

SESSION – 2

BINARY LOGIC

1. While Balbir had his back turned, a dog ran into his butcher shop, snatched a piece of meat off the counter and ran out. Balbir was mad when he realised what had happened. He asked three other shopkeepers, who had seen the dog, to describe it. The shopkeepers really didn't want to help Balbir. So each of them made a statement which contained one truth and one lie.

   Shopkeeper Number 1 said: "The dog had black hair and a long tail."

   Shopkeeper Number 2 said: "The dog has a short tail and wore a collar."

   Shopkeeper Number 3 said: "The dog had white hair and no collar."

   Based on the above statements, which of the following could be a correct description?

   (a) The dog had white hair, short tail and no collar.

   (b) The dog had white hair, long tail and a collar.

   (c) The dog had black hair, long tail and a collar.

   (d) The dog had black hair, long tail and no collar.

2. Out of three people X, Y and Z, one is a knight, one a knave and the third a spy, who can either speak the truth or lie. X says: "Y is not a spy." Z says: "X is a spy." Which of the following statements is definitely true?

   (a) X is a knave (b) Y is a knave

   (c) X is a spy (d) Y is a knight

3. Shahrukh speaks truth only in the morning and lies in the afternoon, whereas Salman speaks truth only in the afternoon. A says that B is Shahrukh. Is it morning or afternoon and who is A - Shahrukh or Salman?

   (a) Afternoon, Shahrukh (b) Afternoon, Salman

   (c) Morning, Shahrukh (d) Morning, Salmon

4. Five college students met at a party and exchanged gossips. Uma said, "Only one of us is lying". David said, "Exactly two of us are lying". Thara said, "Exactly 3 of us are lying". Querishi said, "Exactly 4 of us are lying". Chitra said "All of us are lying". Which one was telling the truth?

   (a) David (b) Quershi (c) Chitra (d) Thara

5. Rajesh, Rakesh, Prakash-among Truth-teller, Liar, Alternator in any order. When asked about their category, they replied:

   Rajesh: Prakash is an alternator. I am the Truth-teller.

   Rakesh: I am the liar. Prakash is the Truth-teller.

   Prakash: I am not the liar. Rajesh is not an alternator.

   Who is the Truth-teller?

   (a) Rajesh

   (b) Rakesh

   (c) Prakash

   (d) Cannot be determined

6. On an Island there live three types of tribes Sachcha, Jhutha and Lota. Sachchas always tell the truth, Jhuthas always lie and Lotas tell the truth and lie alternating (they can tell truth first or lie first). Three persons (of different tribes) from this Island give these statements.

   GOOD: UGLY is of Sachcha tribe: I am of Lota tribe

   BAD: GOOD is of Jhutha tribe; I am of Sachcha Tribe

   UGLY: BAD is of Jhutha tribe; I am of Lota tribe.

   GOOD belongs to which tribe?

   (a) Sachcha (b) Jhutha

   (c) Lota (d) either (a) or (c)

   (e) Cannot say

7. Out of three people (Lavesh, Mayank and Manoj), one of them is a king, one a bureaucrat, and one a thief.

   The king always tells the truth, the bureaucrat always lies, and the thief can either lie or tell the truth.

   Lavesh says: 'Manoj is a bureaucrat.'

   Mayank says: 'Lavesh is a king.'

   Manoj says: 'I am the thief.'

   Who is the king, who the bureaucrat, and who the thief?

   (a) Lavesh – King, Manoj – Thief, Mayank – Bureaucrat

   (b) Lavesh – Thief, Mayank – King, Manoj – Bureaucrat

   (c) Lavesh – King, Mayank – Thief, Manoj – Bureaucrat

   (d) Mayank – Thief, Manoj – King, Lavesh – Bureaucrat

8. It is known only one character is telling the truth.

   Mr. April says that Mr. May tells lies.

   Mr. May says that Mr. June tells lies.

   Mr. June says that both Mr. April and Mr. May tell lies.

   Who is telling the truth?

   (a) Mr. May (b) Mr. June

   (c) Mr. April (d) Cannot be determined

9. Three persons give these statements.

   P says either Gandhi or Nehru wins the elections.

   Q says Gandhi wins.

   R says neither Gandhi nor Nehru wins the elections.

   In these statements only one is wrong. Who wins the elections?

   (a) Gandhi

   (b) Nehru

   (c) Either Gandhi or Nehru

   (d) Neither Gandhi nor Nehru

10. One of these three is telling the truth, and the other two are lying. Based on their statements, can you determine who is telling the truth?

    A: I never lie.

    B: A is lying. I'm the one telling the truth!

    C: B is lying, I'm the honest one!

    (a) B (b) A

    (c) C (d) Cannot be determined

Directions for 11 and 12: Read the question below very carefully and choose the correct answer for the questions that follow:

On an island 'Tristan da Cunha' the inhabitants always answer any question with two sentences – one of which is always true and the other always false.

The Head of the island discovers illegal activities. In order to determine the identity of the culprits and also to know more about the next heist on the basis of the plane and what it looks like. This is what they have to say:

S: It arrives at 9:00 p.m. The colour of the plane is only red.

R: It arrives at 9:00 p.m. The colour of the plane is only red.

B: I know at what time the ship arrives. R is lying about the time of arrival.

11. At what time does the plane arrive?
(a) 4 p.m. (b) 9:00 p.m.
(c) Can't say (d) Won't arrive

12. What is the colour of the plane?
(a) Can't say (b) Red
(c) Blue (d) Both red and blue

Directions for Q13 to Q17: Read the question below very carefully and choose the correct answer for the questions that follow:

There are two types of inhabitants at Hawaii Islands – X type and Y type. The X type of inhabitants always speaks the truth and the Y type of inhabitants always lie.

13. John says, "I always lie". Which type of an inhabitant is he?
(a) X
(b) Y
(c) Either X or Y
(d) The given statement infeasible

14. David says, "According to John. I always speak the truth". Which of the following is a correct conclusion?
(a) David has to be of type X.
(b) David has to be of type Y.
(c) John has to be of type X.
(d) John has to be of type Y.

15. Mike says, "Albert and I are of the same type". Which of the following is a correct conclusion?
(a) Mike and Albert are necessarily of the same type.
(b) Albert has to be of type X.
(c) Mike and Albert cannot be of the same type.
(d) The given statement is infeasible.

16. Rolly says, "Soni and I are of different types". Which of the following is a correct conclusion?
(a) Rolly and Soni are of Type Y and Type X respectively.
(b) Rolly and Soni cannot be of the same type.
(c) Soni has to be of Type Y.
(d) Rolly has to be of Type Y.

17. Mike says, "At least one person among Albert and I always lies". What types are Mike and Albert respectively?
(a) Y, X
(b) Y, Y
(c) X, Y
(d) It is not possible to deduce

Directions for Q18 to Q20: Refer to the passage below and answer the questions given below it.

The inhabitants of the Island of Middle Andaman Island have very bright and interesting lives. Just as we earthlings have continuity in our routine lives, the inhabitants of the Island of Middle Andaman Island have continuity in both their waking lives, as well as their dreams. As result, the inhabitants of the Island of Middle Andaman Island have great difficulty in knowing whether they are awake or asleep at a given time. However, the inhabitants can be classified into two broad types – Awakers and Asleepers.

An Awaker is characterized by the fact that everything they believe while they are awake is true, and everything they believe while they are asleep is false. An Asleeper on the other hand, has the characteristic that everything he believes while asleep is try, and everything he believes while awake is false.

18. The island has a King, an advisor and a Doctor. At one point, the Doctor believed that his bosses were of different types. Twelve hours later, he changed his state (from sleeping to waking or from waking to sleeping), and he then believed that the King was an Awaker and the Advisor was an Asleeper. What type is the King?
(a) Awaker
(b) Asleeper
(c) Could be either of the two types
(d) Data inconsistent

19. With reference to the previous question, what type is the Advisor?
(a) Awaker
(b) Asleeper
(c) Could be either of the two types
(d) Data inconsistent

20. At one time, and inhabitant believed that he was both asleep and awake, what was he really?
(a) Awaker
(b) Asleeper
(c) Could be either of the two types
(d) Data inconsistent

SESSION – 3

SEQUENTIAL OUTPUT TRACING (ALGORITHM BASED)

In questions of this type, you are given information about a computing machine which accepts an input, processes it according to certain rules and then gives the desired output. Usually, you are informed of the steps followed for processing a sample input and what the desired output would be. You are expected to identify the rule or the set of rules (algorithm) which governs the machine and then answer the questions related to how the machine would process other inputs. The input would usually be a string of words/numbers which are to be processed.

Directions for Q1 to Q6: A word and number arrangement machine when given an input line of words and numbers rearranges them following a particular rule in each step. The following is an illustration of input and rearrangement.

Input: but 32 71 glory fair south 65 84
Step I: south but 32 71 glory fair 65 84
Step II: south 84 but 32 71 glory fair 65
Step III: south 84 glory but 32 71 fair 65
Step IV: south 84 glory 71 but 32 fair 65
Step V: south 84 glory 71 fair but 32 65
Step VI: south 84 glory 71 fair 65 but 32
and Step VI is the last step of the rearrangement.

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. Step III of an input is : year 92 ultra 15 23 strive house 39.
How many more steps will be required to complete the rearrangement?
(a) Three (b) Four (c) Two
(d) Five (e) None of these

2. Input: any how 49 24 far wide 34 69
Which of the following steps will be the last but one?
(a) VI (b) VII (c) V
(d) VIII (e) None of these

3. Step II of an input is : town 74 pair 15 31 nice job 42
Which of the following is definitely the input?
(a) pair 15 31 town nice job 42 74
(b) pair 15 town 31 74 nice job 42
(c) pair 15 town 74 31 nice job 42
(d) Cannot be determined
(e) None of the above

4. Input : play over 49 37 12 match now 81.
Which of the following will be step IV?
(a) play 81 over 49 37 match now
(b) play 81 over 49 37 12 match now
(c) play 81 over 49 now 37 match 12
(d) There will be no such step
(e) None of the above

5. Step II of an input is: war 58 box cart 33 49 star 24.
Which of the following steps will be the last?
(a) V (b) VI (c) IV
(d) VII (e) None of these

6. Input : shower fall water 34 51 67 98 goal.
How many steps will be required to complete the rearrangement?
(a) Three (b) Four (c) Six
(d) Five (e) None of these

Directions for Q7 to Q9: Study the following information carefully and answer the questions given below it.

A word and number arrangement machine when given an input line of words and numbers rearranges them following a particular rule in each step. The following is an illustration of input and various steps of rearrangement. (All the numbers are two digit numbers).

Input: more presence required 12 42 70 for 63 37 good work 28
Step I: for 70 more presence required 12 42 63 37 good work 28
Step II: good 63 for 70 more presence required 12 42 37 work 28
Step III: more 42 good 63 for 70 presence required 12 37 work 28
Step IV: presence 37 more 42 good 63 for 70 required 12 work 28
Step V: required 28 presence 37 more 42 good 63 for 70 12 work
Step VI: work 12 required 28 presence 37 more 42 good 63 for 70

And step VI is the last step of the rearrangement as the desired arrangement is obtained. As per rules followed in the above steps, find out in each of the questions the appropriate step for the given input.

7. **Input:** man 58 32 18 want to become 75 99 lazy god 35
Which number is the following output?
'man 35 lazy 58 god 75 become 99 32 18 want to'
(a) Step I (b) Step V
(c) Step IV (d) There is no such step

8. Which word/ number would be fourth from the left in Step V?
(a) man (b) 35 (c) god (d) 99

9. **Input:** Money 48 24 18 wanted for investment 65 90 lock credit 32
How many elements (words/ numbers) are there between "for" and "18" in Step III?
(a) four (b) Three (c) six
(d) seven (e) five

Direction for Q10 to Q13: Study the following information carefully and answer the questions given below.

A word and number arrangement machine when given an input line of words and numbers rearranges them following a particular rule in each step. The following is an illustration of input and various steps of rearrangement. (All the numbers are two digit numbers).

Input: sweet 46 nice 36 friend 26 help 96 bright 76 kind 66

Step I: sweet 46 nice 36 friend 26 help bright 76 kind 66 96

Step II: sweet nice 46 36 friend 26 help bright kind 66 76 96

Step III: sweet nice kind 46 36 friend 26 help bright 66 76 96

Step IV: sweet nice kind help 36 friend 26 bright 46 66 76 96

Step V: sweet nice kind help friend 26 bright 36 46 66 76 96

Step VI: sweet nice kind help friend bright 26 36 46 66 76 96

And Step VI is the last step of the rearrangement as the desired arrangement is obtained.

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

Input: arrow 98 paint 58 lamb 38 each 78 great 18 most 48 rent 88

10. Which word/number would be fifth to the left of sixth element from the right in the step V?
(a) great (b) arrow (c) lamb
(d) 38 (e) 48

11. Which of the following will represents the position of "58" in step IV?
(a) Eight from left (b) Third from right
(c) Ninth from left (d) Eleventh from left
(e) fifth from right

12. Which step is the following output?
Rent paint most arrow 58 lamb 38 each great 18 48 78 88 98
(a) Step II (b) Step V
(c) Step VI (d) Step III
(e) There is no such step

13. How many elements (words/numbers) are there between "most" and "78" as they appear in the step VI?
(a) Eight (b) Seven (c) Nine
(d) Five (e) Four

Directions for Q14 to Q16: Study the following information carefully and answer the questions given below.

A word and number arrangement machine when given an input line of words and numbers rearranges them following a particular rule in each step. The following is an illustration of input and various steps of rearrangement. (All the numbers are two digit numbers).

Input: 11 day 34 night 93 pace 27 easy 44 joy

Step I: 93 11 day 34 night pace 27 easy 44 joy

Step II: 93 11 34 day night pace 27 easy 44 joy

Step III: 93 44 11 34 night pace 27 easy joy day

Step IV: 93 44 11 34 night pace 27 joy day easy

Step V: 93 44 34 11 night pace 27 joy day easy

Step VI: 93 44 34 11 night pace 27 day easy joy

Step VII: 93 44 34 27 11 night pace day easy joy

Step VIII: 93 44 34 27 11 pace day easy joy night

Step IX: 93 44 34 27 11 day easy joy night pace

And step IX is the last step of the rearrangement as the desired arrangement is obtained. As per rules followed in the above steps, find out in each of the questions the appropriate step for the given input.

Input: Class 25 war 15 race 73 heap 58 just 88 take 38

14. What is the position of 'war' in the Step VII?
(a) seventh from the left end
(b) eighth from the right end
(c) fifth from the left end
(d) fifth from the right end
(e) sixth from the left end

15. Which of the following represents the step X?
(a) 88 73 58 38 25 war 15 race take class heap just
(b) 88 73 58 38 25 15 class heap just race take war
(c) 88 73 58 38 25 15 war class heap just race take
(d) 88 73 58 38 25 15 war take class heap just race
(e) There is no such step

16. How many steps are required to complete this arrangement?
(a) 11 (b) 12 (c) 10
(d) 9 (e) None of these

Directions for Q17 to Q20: Study the following information carefully to answer the given questions.

A word and number arrangement machine when given an input line of words and numbers rearranges them following a particular rule in each step. The following is an illustration of an input and its rearrangement.

Input: 46 31 point turn 52 line bill fine 57 36

Step I: bill 46 31 point turn 52 line fine 57 36

Step II: bill 46 31 point turn 52 line fine 36 57

Step III: bill fine 46 31 point turn 52 line 36 57

Step IV: bill fine 46 31 point turn line 36 52 57

Step V: bill fine line 46 31 point turn 36 52 57

Step VI: bill fine line 31 point turn 36 46 52 57

Step VII: bill fine line point 31 turn 36 46 52 57

Step VIII: bill fine line point turn 31 36 46 52 57

And Step VIII is the last step of the above input. As per the rules followed in the above steps, find out the appropriate steps for the above input.

Input: 89 speed very 87 65 expert 91 comment over 78 must 56

17. How many steps will be required to complete the rearrangement?
(a) Five (b) Six (c) Seven
(d) Nine (e) None of these

18. Which of the following is the fourth element from the left in Step IV?
(a) speed (b) very (c) 89
(d) 65 (e) None of these

19. What is the position of 'over' from the right end in Step VII?
(a) Sixth (b) Eighth (c) Ninth
(d) Tenth (e) None of these

20. Which of the following is third to the left of '87' in Step V?
(a) over (b) 65 (c) must
(d) 89 (e) None of these

SESSION – 4

CRYPTARITHMETIC

1. Decrypt the code P A S C A L.

```
  B A S I C +
  L O G I C
-------------
P A S C A L
-------------
```

(a) 142345 (b) 108204
(c) 126523 (d) None of these

2. Decrypt the code Z I T H E R.

```
  C E L L O +
    H O R N
-------------
Z I T H E R
-------------
```

(a) 104862 (b) 125647
(c) 134762 (d) None of these

3. Decrypt the code F O L D E R.

```
  C R A S H +
  E R R O R
-------------
F O L D E R
-------------
```

(a) 236481 (b) 248915
(c) 154987 (d) None of these

4. Decrypt the code E U R O P A.

```
  S A T U R N +
    T I T A N
-------------
T R I T O N
-------------
E U R O P A
-------------
```

(a) 984521 (b) 948563
(c) 984556 (d) 9484586

5. Decrypt the code L H A L.

```
    H O W
      W E ×
-------------
H A I L
P A L
-------------
L H A L
-------------
```

(a) 5105 (b) 3543
(c) 4104 (d) None of these

6. Decrypt the code M A P O E.

```
      A P T
        T O ×
-------------
  M O V E
M V D T
-------------
M A P O E
-------------
```

(a) 24360 (b) 25486
(c) 28451 (d) None of these

7. Decrypt the code J O H N S O N.

```
    L Y N D O N
              B ×
-------------
J O H N S O N
-------------
```

(a) 3546456 (b) 3420840
(c) 3215425 (d) None of these

8. Decrypt the code T Y S O L.

```
      A S K
        T O ×
-------------
  K A R L
O S A K
-------------
T Y S O L
-------------
```

(a) 74860 (b) 74682
(c) 74398 (d) 74895

9. Decrypt the code D I C E D.

```
      A I D
        A D ×
-------------
  R I A D
D D C D
-------------
D I C E D
-------------
```

(a) 68476 (b) 18961
(c) 68956 (d) 59625

10. Decrypt the code P O S T.

```
  S T O P
– P A S T
---------
  P O S T
---------
```

(a) 9284 (b) 4392
(c) 4892 (d) None of these

11. Decrypt the code S N U B.

```
  C O U N T
– C O I N
---------
    S N U B
---------
```

(a) 6795 (b) 9567
(c) 9805 (d) 5790

12. Decrypt the code D Y N A.

```
          K M
        -----
A K A | D A D D Y
        D Y N A
      -------
        A R M Y
        A R K A
      -------
            R A
      -------
```

(a) 4025 (b) 1605
(c) 4680 (d) 1050

13. Decrypt the code L I N K.

```
          K T
        -----
N E T | L I N K
        N E T
      -------
        K E K K
        K T E C
      -------
          K E Y
      -------
```

(a) 2345 (b) 4275
(c) 6542 (d) 6041

14. Decrypt the code A P P L E.

```
  A P P L E
– T H A T
---------
    E A T
---------
```

(a) 20035 (b) 31140
(c) 10038 (d) 32241

15. Decrypt the code M A T.

```
        E Y E
      M A T ×
    ---------
      S Y I A
    G M T A
  A I R Y
  ---------
  A A S M A A
  ---------
```

(a) 634 (b) 327 (c) 201 (d) 305

16. Decrypt the code P A S.

```
        P A S
      R B Q ×
    ---------
      S B K W
    A S A A
  S E P B
  ---------
  S Q S K A W
  ---------
```

(a) 543 (b) 345 (c) 421 (d) 273

17. Decrypt the code N A M E.

```
      H E
    E H ×
  -------
    H E
  H H A
  -------
  H N M E
  -------
```

(a) 1207 (b) 2907
(c) 1907 (d) 1709

18. Decrypt the code M O N E Y.

```
    S E N D
+ M O R E
---------
M O N E Y
---------
```

(a) 10453 (b) 10851
(c) 10652 (d) 15620

19. Decrypt the code H G B C.

```
      A B C
×       D E
  -------
      F E C
    D E C
  -------
  H G B C
  -------
```

(a) 5650 (b) 4625 (c) 2510 (d) 5210

20. Decrypt the code H U N T.

```
    N O
× G U N
    N O
-------
H U N T
-------
```

(a) 1082 (b) 1253
(c) 8201 (d) 2081

DATA ANALYSIS & DATA INTERPRETATION

SESSION – 5

DATA SUFFICIENCY

Directions for Q1 to Q20: Each problem consists of a question and two statements, labelled (1) and (2), in which certain data are given. You have to decide whether the data given in the statements are sufficient for answering the question.

Mark Choice (1) If statement 1 alone is sufficient, but statement 2 alone is not sufficient to answer the question;

Choice (2) If statement 2 alone is sufficient, but statement 1 alone is not sufficient to answer the question;

Choice (3) If both the statement (1) and (2) together are sufficient to answer the question but neither statement alone is sufficient;

Choice (4) If each statement alone is sufficient to answer the question;

Choice (5) If both the statement (1) and (2) together are not sufficient to answer the question and additional data specific to the problem are needed.

1. Is a= b?
   Statement 1: Data sufficiency = $(a + b)(\frac{1}{a} + \frac{1}{b}) = 4$
   Statement 2: $(a-50)^2 = (b-50)^2$

2. If a salesman received a commission of 3% of the sales that he has booked in a month, what was the sales booked by the salesman in November 2003?
   Statement 1: The sales booked by the salesman in the month of November 2003 after subtracting the salesman's commission was Rs.245,000.
   Statement 2: The value of the sales booked by the salesman in the month of November 2003 was 125 percent of the original purchase price of Rs.225,000.

3. If only people who paid the deposits attended the Management Seminar, how many people attended this year?
   Statement 1: 70 people sent in deposits to attend the Management Seminar this year.
   Statement 2: 60 percent of the people who sent deposits to attend the Management Seminar this year actually went.

4. A car drives along a straight road from A to B, going through Madurai along the way. What is the total distance travelled by the car from A to B?
   Statement 1: The distance from A to C is 3/5 of the entire distance.
   Statement 2: The distance from C to B is 12 km.

5. Hari purchased 18 cans of soda, some of which contained diet soda. How many of the cans did not contain diet soda?
   Statement 1: Of the cans Hari purchased, the number containing diet soda is equal to the number not containing diet soda.
   Statement 2: Of the cans Hari purchased, the number of cans containing diet soda is odd.

6. In 2000, was the number of people in city X greater than three times the number of people in city Y?
   Statement 1: In 2000, there were approximately 1.1 million more people in city X than in city Y.
   Statement 2: In 2000, the 300,000 Hindus in city X made up for 20 percent of its population and the 141,000 Buddhists in city Y made up for 30 percent of its population.

7. What is the surface area of the rectangular solid y?
   Statement 1: The dimensions of one face of the rectangular solid y are 2 by 3.
   Statement 2: The area of another face of the rectangular solid y is 6.

8. During a five-day period, Monday through Friday, the average (arithmetic mean) high temperature was 86 degrees Fahrenheit. What was the high temperature on Friday?
   Statement 1: The average high temperature for Monday through Thursday was 87 degrees Fahrenheit.
   Statement 2: The high temperature on Friday reduced the average high temperature for the week by 1 degree Fahrenheit.

9. If q is an integer, then sqrt ($p^2 + q^2$) is an integer?
   Statement 1: $p^2 + q^2$ is an integer.
   Statement 2: $p^2 - 3q^2 = 0$

10. Is p + q = zero ?
    Statement 1: pq < 0
    Statement 2: $p^2 = q^2$

11. Is a – b is greater than p – q?
    Statement 1: a > p and b < q.
    Statement 2: b = 7, q = 8, a = 14 and p = 12.

12. How many people are there in the plane?
    Statement 1: 25% passengers are women and 35% are children.
    Statement 2: There are 24 men in the plane.

13. Is x divisible by 28?
Statement 1: x is divisible by 20.
Statement 2: x is divisible by 84.

14. What is the two-digit number?
Statement 1: The difference between the two digits is 3.
Statement 2: The sum of the two digits is 4 more than their difference.

15. What is the sum of the digits of a two-digit number?
Statement 1: The difference between the digits of that number is 1.
Statement 2: One-seventh of the number is 7 more than one-third of 21.

16. What will be the ratio between the two digits in the two digit number?
Statement 1: The largest digit is 9.
Statement 2: The sum of the digits in the number is 5 times their difference.

17. What is the two-digit number?
Statement 1: The product of two digits in the number is 32 and the ratio of their digits is 2:1.
Statement 2: Sum of the two digits is 12 and their difference is 4.

18. What is the standard deviation (SD) of the four numbers p, q, r, s?
Statement 1: The sum of p, q, r and s is 24.
Statement 2: The sum of the squares of p, q, r and s is 224.

19. How is Bill related to Betty?
Statement 1: Cindy, the wife of Bill's only brother Chris does not have any siblings.
Statement 2: Betty is Cindy's brother in law's wife.

20. When Y is divided by 2, is the remainder 1?
Statement 1: $(-1)^{(Y+2)} = -1$
Statement 2: Y is prime.

SESSION – 6

DATA INTERPRETATION – TABLES

Directions for Q1 to Q5: Answer the questions based on the following information.

The following table gives the percentage change in the sales of Mobile phones over that in the previous year for five companies.

Company	2002	2003	2004	2005	2006
Tokia	10%	20%	– 15%	25%	8%
Zamsung	15%	25%	– 30%	8%	20%
Notorola	10%	– 10%	15%	20%	15%
Mericsson	– 10%	20%	10%	15%	– 10%
Rower	20%	15%	10%	– 20%	30%

Here "–" indicates decrease.
The following table gives the total sales of the given companies in the year 2001(Number of pieces in Millions)

Year	Tokia	Zamsung	Notorola	Mericsson	Rower
2001	32	48	56	50	60

1. What is the total number of Tokia mobiles sold(in million) in 2006(approximately)?
(a) 50 (b) 45 (c) 48 (d) 52

2. What is the ratio of number of Zamsung mobiles sold in 2004 to the number of Mericsson mobiles sold in the same year?
(a) 10:13 (b) 121:360
(c) 11:12 (d) None of these

3. What is the approximate difference between the number of Notorola mobiles sold in 2005 and the number of Rower mobiles sold in the same year(in millions)?
(a) 3.5 (b) 5 (c) 10 (d) 13

4. What is the total number of mobiles sold by the given companies in 2002(in millions)?
(a) 253 (b) 269 (c) 274 (d) 263

5. How many Zamsung mobiles were sold in 2005 (in millions)?
(a) 52.164 (b) 55.384
(c) 50.286 (d) 49.268

Directions for Q6 to Q10: Answer the questions based on the following table which gives the data relating to salt industry over a period of four years. All figures are in lakhs of tonnes(Lt).

	2007–08 (Actual)	2008–09 (Provisional)	2009–10 (Estimate)	2010–11 (Forecast)
Opening stock with factories	41	88	169	88
Buffer stock	85	62	56	67
Production	275	300	180	230
Total supply	360	450	405	385
OFF take Domestic	180	190	200	210
Exports	30	35	50	40
Total demand	210	225	250	250
Balance	150	225	155	135

Note: Balance = Total supply – Total demand

6. Supposing that in 2007–08, the domestic demand for salt was 20% more than the value given and the forecast production in 2010–11 was 30% less, then find the difference between the two values(in lakh tonnes).
(a) 69 (b) 52 (c) 55 (d) 50

7. Supposing that in 2007–08, the total demand for salt was 12% higher than that mentioned in the table, then the new total supply demand gap for 2007–08 (if all other values remained the same) would be(in lakh tonnes)
(a) 124.8 (b) 114.8 (c) 104.8 (d) 94.8

8. The excess of forecast demand for 2010–11 over the estimated total demand for 2009–10 is (in lakh tonnes)
(a) 3.2 (b) 1.6 (c) 0.8 (d) Nil

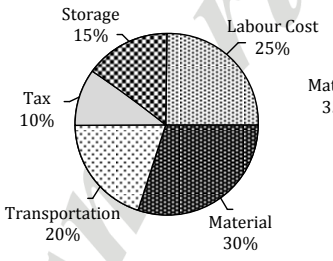
9. Find the percentage growth in domestic demand over the given period.
(a) $8\frac{1}{3}\%$ (b) $16\frac{2}{3}\%$ (c) 10% (d) 20%

10. Find the percentage increase in the production from 2007–08 to 2008–09.
(a) 9.1 % (b) 12% (c) 13% (d) $8\frac{1}{3}\%$

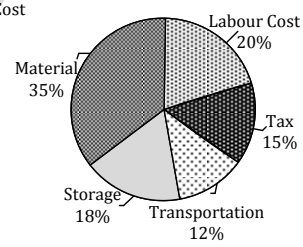
DATA INTERPRETATION –PIE CHART

Directions for Q11 to Q15: Study the following pie-charts carefully to answer these questions.

The pie-charts show the percentage distribution of the manufacturing cost (cost price) of articles A and B.



Total manufacturing cost of article A = ₹ 16,200



Total manufacturing cost of article B = ₹24,800

11. The labour cost incurred in manufacturing B is approximately what percentage more/ less than that of A?
(a) 30% (b) 25% (c) 22% (d) 20%

12. If the profit earned by selling A is 25% and that earned by selling B is 20%, then what is the ratio of the selling prices of A and B?
(a) 675:992 (b) 484:1125
(c) 789:1280 (d) 111:237

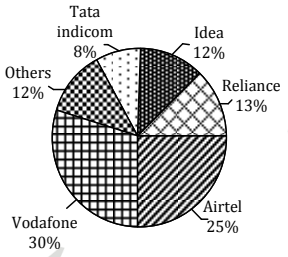
13. If the transportation cost incurred in manufacturing A increases by 10%, the material cost decreases by 15%, and all other costs remain the same, then what would be the cost price of A (in Rs.)?
(a) 16870 (b) 15809 (c) 16815 (d) 15795

14. The storage cost of A is what percentage of that of B (approximately)?
(a) 52% (b) 54% (c) 60% (d) 48%

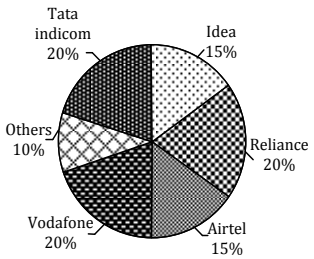
15. What is the difference between the material costs incurred in manufacturing A and B (in Rs.)?
(a) 4010 (b) 3930 (c) 3820 (d) 3560

Directions for Q16 to Q20: Answer these questions based on the following pie-charts.

The following are the results of a survey about mobile users in a village in the years 2005 and 2006.



2005
Total = 10,000



2006
Total = 11,500

16. The number of Vodafone users in 2006 is what percentage of that in 2005?
(a) $77\frac{4}{5}\%$ (b) $60\frac{4}{5}\%$
(c) $76\frac{2}{3}\%$ (d) Cannot be determined

17. The number of Tata indicom users in 2006 is by what percentage more than that in 2005?
(a) 192.8% (b) 187.5 %
(c) 178.6 % (d) Cannot be determined

18. What is the ratio of the number of Idea users in 2005 to the number of Airtel users in 2006?
(a) 16:23 (b) 54:61 (c) 47:59 (d) None of these

19. If the total number of mobile users in the village in 2006 was 2300, then proportionately how many people used Airtel in 2005?
(a) 600 (b) 500 (c) 700 (d) 800

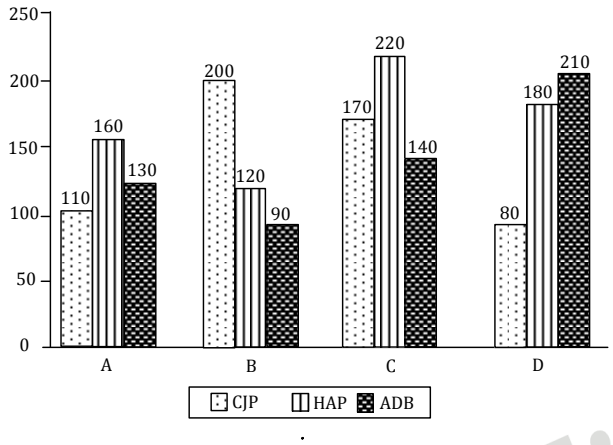
20. If in 2007, 20% of the Tata indicom users in 2006 no longer use Tata indicom but shifted to 'Others', then what is the ratio of the number of people who use 'Others' in 2005 to that in 2007 if all other values in 2007 remain the same as in 2006?
(a) 23:10 (b) 12:5 (c) 17:9 (d) None of these

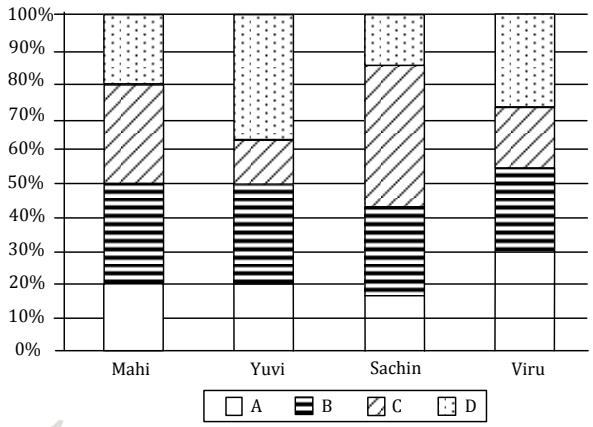
SESSION – 7

DATA INTERPRETATION – BAR DIAGRAM

Directions for Q1 to Q5: Study the following graph to answer the questions below.

Only four parties CJP, HAP, ADB, CJB contested the election in each of the four constituencies A, B, C and D in which the elections were held in 2007. The following graph gives the number of votes secured (in thousands) by the candidates of CJP, HAP, ADB in each of the constituencies.





Note: The total number of votes polled in the 4 constituencies are as follows

A – 450000

B – 500000

C – 600000

D – 575000

1. In which constituency did CJB get the minimum number of votes?
(a) A (b) B (c) C (d) D

2. What is the difference between the number of votes secured by HAP in B and C together and that by ADB in A and D together?
(a) 50,000 (b) 20,0000
(c) 10,000 (d) None of these

3. The number of votes secured by HAP in B is what percentage of the number of votes it received in A, B, C and D put together?
(a) 20.8% (b) 17.6%
(c) 14.3% (d) 15.8%

4. In how many constituencies are the votes received by CJB as a percentage of the total votes cast in that constituency more than 17%?
(a) 0 (b) 1 (c) 2 (d) 3

5. What is the ratio of number of votes secured by HAP in B and D to that secured by CJB in A and C?
(a) 5:3 (b) 5:4 (c) 3:2 (d) 5:2

Directions for Q6 to Q10: Answer these questions based on the following information.

Four persons – Mahi, Yuvi, Sachin and Viru have amounts of Rs.1 lakh, Rs.2 lakh, Rs.1 lakh and Rs.2 lakh respectively with them. They invested all the amounts with them in the shares of four companies A, B, C, D as shown.

6. Who invested the maximum amount in the shares of company A?
(a) Mahi (b) Yuvi (c) Sachin (d) Viru

7. The cumulative investment made by all the four is maximum in the shares of which company?
(a) A (b) B (c) C (d) D

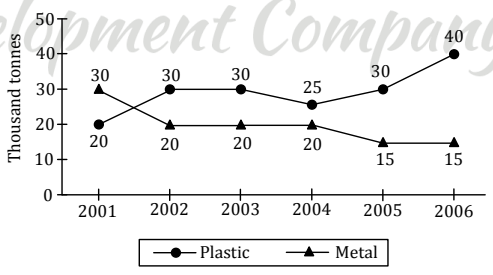
8. If another Rs.50000 is invested by Mahi in the shares of company A and all other values remain the same, then in which company the total investment of all the four persons is the highest?
(a) A (b) B (c) C (d) D

9. What percentage of the total investment of all the four is the investment in the shares of company C?
(a) 24.33% (b) 23.33% (c) 25.33% (d) 26.33%

10. Who among the four persons made the maximum number of investments in the range of Rs.20,000 to Rs.50,000(both inclusive)?
(a) Mahi (b) Yuvi (c) Sachin (d) Viru

DATA INTERPRETATION – LINE GRAPH

Directions for Q11 to Q15: Answer the questions given as per details given in the graph, which provides the consumption of metal and plastic across 6 years.



11. What is the number of years for which the consumption of metal was less than the consumption of plastic over the given period?
(a) 4 (b) 2 (c) 3 (d) 5

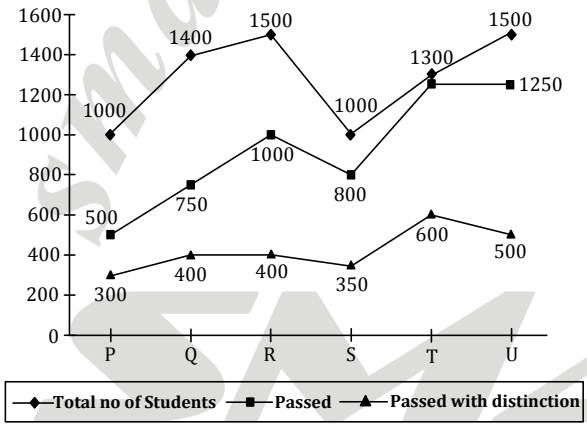
12. For how many years has the consumption of metal and plastic put together showed a decrease over the previous year's consumption?
(a) 2 (b) 1 (c) 3 (d) 4

13. What is the ratio of the total consumption of metal to that of plastic in the given period?
(a) 4:5 (b) 18:23 (c) 19:23 (d) 24:35

14. What is the percentage increase in the total consumption of the products in 2006, over that in 2005?
(a) $33\frac{1}{3}\%$ (b) $22\frac{2}{9}\%$
(c) $16\frac{2}{3}\%$ (d) 37.5%

15. During which period did the consumption of both the products, shows a similar trend (both increasing / decreasing / constant)?
(a) 2003–04 (b) 2002–03
(c) 2001–02 (d) 2005–06

Directions for Q16 to Q20: Answer these questions based on the following line graph which shows the performance of students of six schools P, Q, R, S, T and U in a board exam.



16. In which of the following schools is the percentage of students passing without distinction, the least?
(a) P (b) R (c) S (d) U

17. In how many schools is the pass percentage at least 80?
(a) 1 (b) 2 (c) 3 (d) 4

18. In which of the following schools is the ratio of the number of students passing with distinction to those failing, the least?
(a) Q (b) R (c) P (d) T

19. Considering all the six schools, what percentage of the students has passed with distinction?
(a) 33.1% (b) 33.8% (c) 34.2% (d) 35.6%

20. What is the ratio of the total number of students who failed to those who passed, in all the six schools together?
(a) 43:121 (b) 21:37 (c) 43:111 (d) 21:38