Reasoning Lecture – 2

BLOOD RELATIONS

Introduction:

In these tests the success of a candidate depends upon the knowledge of the blood relations, some of which are summarized below to help solve these tests.

Mother's or father's son	:	Brother
Mother's or father's daughter	:	Sister
Mother's or father's brother	:	Uncle
Mother's or father's sister	:	Aunt
Mother's or father's father	:	Grandfather
Mother's or father's mother	:	Grandmother
Brother's son	:	Nephew
Brother's daughter	:	Niece
Uncle or aunt's son or daughter	:	Cousin
Sister's husband	:	Brother – in – law
Brother's wife	:	Sister in – law
Son's wife	:	Daughter – in – law
Daughter's husband	:	Son – in – law
Husband's or wife's sister	:	Sister – in – law
Husband's or wife's brother	:	Brother – in – law

EXAMPLE:

Directions for questions 1 – 3: Read the following information to answer the given questions.

(i) A, B, C, D, E and F are six family members.
(ii) There is one Doctor, one Lawyer, one Engineer, one Pilot, one Student and one Housewife.
(iii) There are two married couples in the family.
(iv) F, who is a lawyer, is father of A.
(v) B is a pilot and is mother of C.
(vi) D is grandmother of C and is a Housewife
(vii) E is father of F and is a Doctor.
(viii) C is brother of A.

1. Which of the following statements is definitely true?
   (1) C is the brother of the Student (2) F is the father of the Engineer
   (3) A is the Engineer (4) E is the father of the Pilot
2. How many female members are there in the family?
   (1) Two only (2) Three only (3) Three or Four (4) Two or Three
3. How is A related to D?
   (1) Grandson (2) Granddaughter
   (3) Either granddaughter or grandson (4) grandmother

Solutions 1 – 3:

1 Either A or C is Engineer, F is father of both A and C. **Answer: (2)**
2. Two or three; B and D (sex of A is not known). **Answer: (4)**
3. Either granddaughter or grandson. **Answer: (3)**

LOGICAL DIAGRAMS

Introduction:

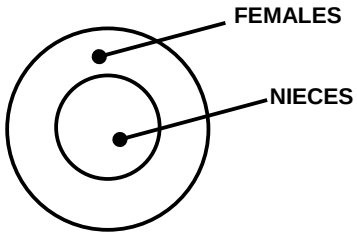
There are three types of logical diagram tests generally asked by the examiner. These are explained below.

TYPE – 1

In Type 1, questions are based on the concept of class. *A class is a group or collection of objects, all having something in common.* For example, a class of females will include all daughters and nieces in a group. There are three possible relationships between any two different classes.

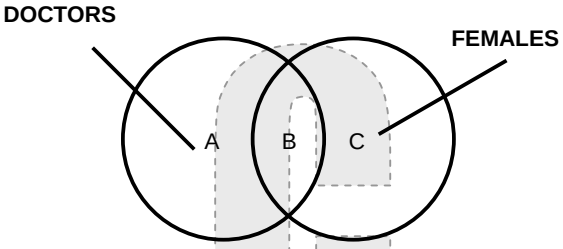
1. Class Containing Classes:

All those females that fall into class of nieces are contained in class of females. The idea that one class may contain another is the most Fundamental logical principle underlying the logical diagram questions.



2. Class Partially Containing Other Classes:

Consider two classes, doctors and females. Since not all doctors are females, no class of doctors can entirely contain the class of females. The partial containment of one class by another class can be picturised in the following way :



Now, in the above figure, the two-joined circles indicate that there are three classes.

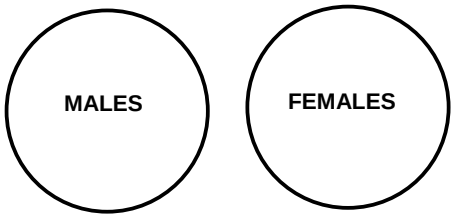
1. Those who are lady doctors. (B)
2. Those who are doctors, but not females. (A)
3. Those who are females, but not doctors. (C)

3. Classes Independent of Each Other

The classes of all males and all females exclude each other, since no female can come into the class of males and also no male can be included into the class of females.

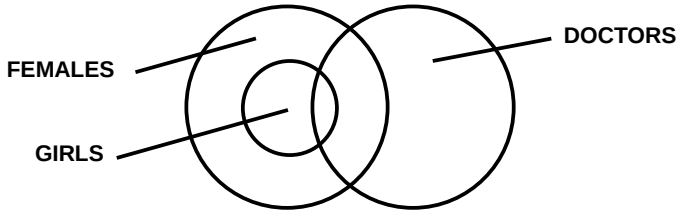
In actual logical diagram tests, you will be working with three circles rather than two, with no new principles of relationships between classes. For example, let us take three different classes,

Females, Doctors, Girls



Now, each of these classes will stand in one of the three types of relationships to the other, i.e. three different two-circle diagrams for females-girls, doctors-females, and doctors-girls.

Instead of three different diagrams, you can represent all of these relationships by intersecting the three circles as in the figure below.



It will be helpful to familiarize yourself with the various patterns of three-circle relationships. Here are the seven most common patterns. Though more than seven patterns are possible, these are the patterns based on which questions are frequently asked.

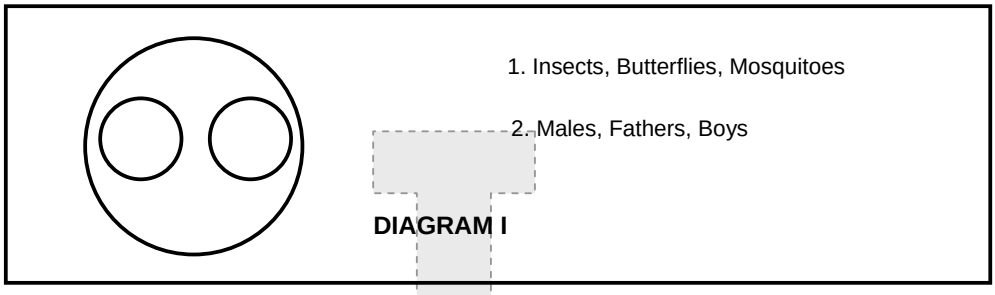


DIAGRAM I

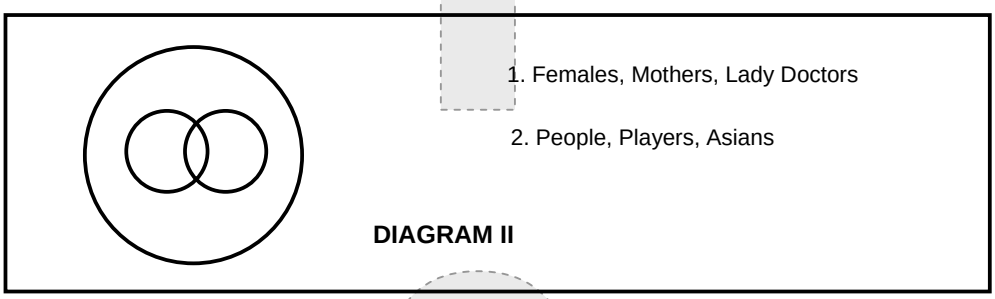


DIAGRAM II

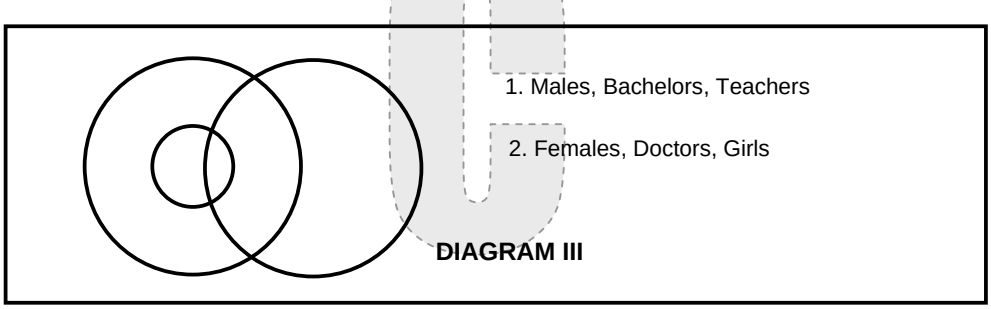


DIAGRAM III

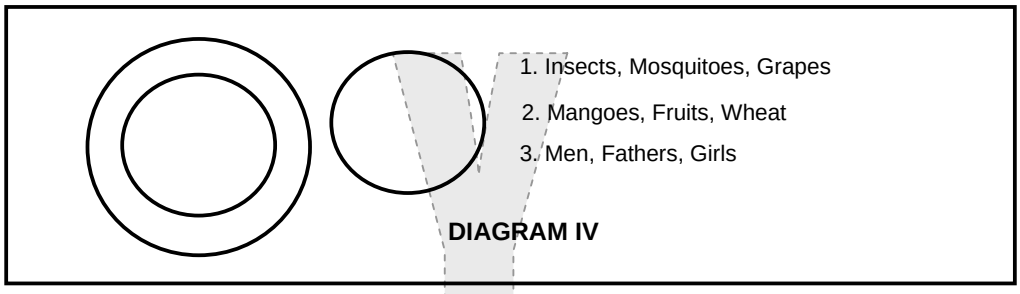


DIAGRAM IV

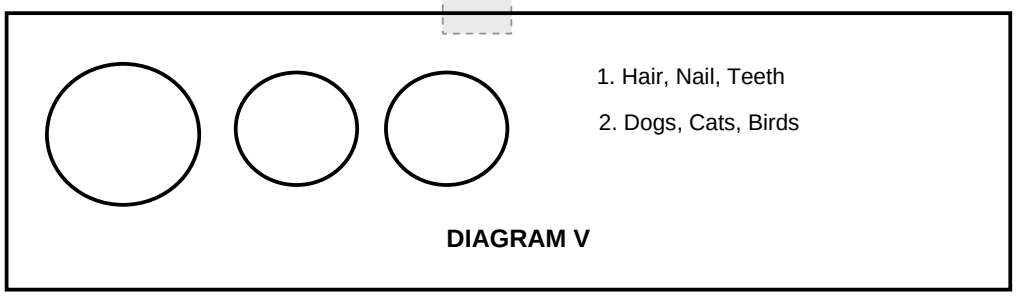
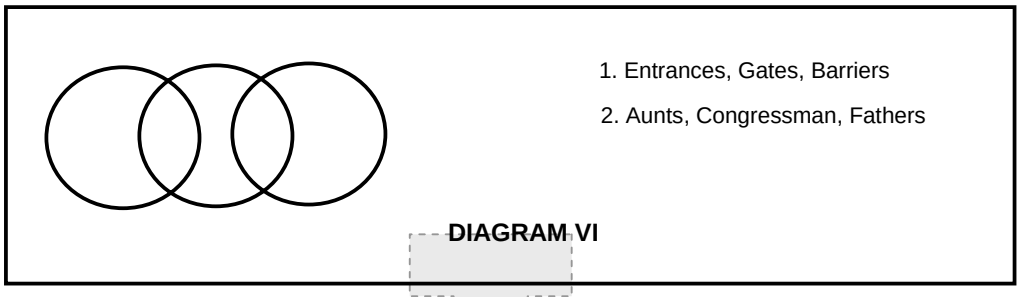
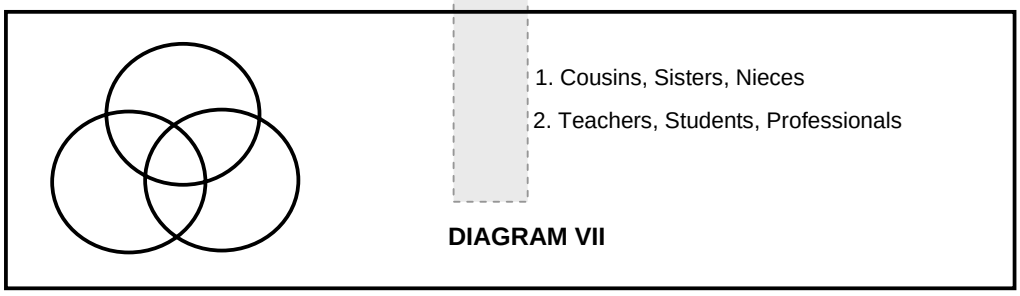


DIAGRAM V



1. Entrances, Gates, Barriers
2. Aunts, Congressman, Fathers

DIAGRAM VI



1. Cousins, Sisters, Nieces
2. Teachers, Students, Professionals

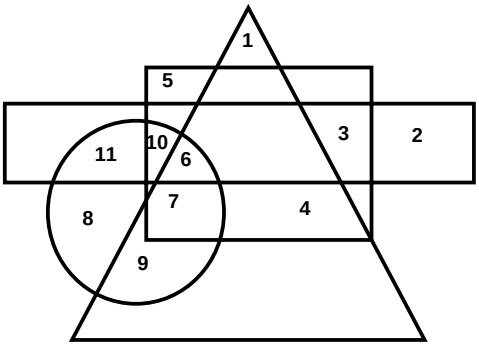
DIAGRAM VII

Based on these principles, a variety of questions can be asked.

TYPE – 2

In this type of questions, there are two sets of principles:

1. One to choose the figure that represents the logical relationship among the items (in the figure);
2. Another to find and measure the portion that represents a particular statement.



Example:

In the adjoining figure, △ represents citizens of Delhi, □ represents males, ▭ represents educated and ◯ represents unemployed. Find out which of the numbers denote the following:

1. Educated female outside Delhi citizens who are also employed.
2. Uneducated unemployed males who are citizens of Delhi.

Answers:

(1) 2 (2) 7

TYPE – 3

In this type of logical diagram question, you'll be able to see through reasoning yourself and deduce the right answer. These are the "Logical Reasoning" questions falling under "Logical Diagrams" type questions; these reasoning questions become easier to understand if we solve them by making use of methods/ tips of logical diagram.

Here you'll be provided with a set of given statements which will be followed by another set of deductions / conclusions. The conclusions are supposed to follow from the question statements, and the statements (or assumptions) are to be taken as true even if they seem to be at a variance with commonly known facts or universal truths.

The candidates are required to practice such questions and find out by themselves whether answering/solving such type of questions is easier by using the techniques of "Logical Reasoning" or "Logical Diagram" questions.

Example:

Statements: 1. Some Indians are Muslims. 2. Some Pakistanis are Muslims.

Conclusions:

(i) Every Muslim is either an Indian or a Pakistani.

(ii) Some Muslims are Indians as well as Pakistanis.

(iii) No Muslim is an Indian as well as a Pakistani.

(iv) Some Muslims are neither Indians nor Pakistanis.

Now, you have to choose your answer from one of the following alternatives

(1) Only II follows (2) Only III follows

(3) Either II or III follows (4) Only I, II and III follow

Answer: (3)

The following diagrams give a clear idea of what can be concluded from the above statements.

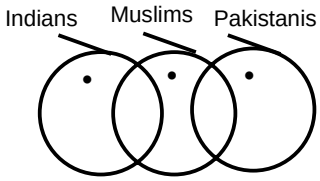


fig (i)

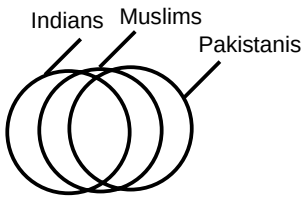


fig (ii)

Now, **fig (i)** infers that there are some Muslims who are Indians and are some who are Pakistanis. Also, there are Muslims who are neither Indian nor Pakistani and **fig (ii)** denotes – there are some who are Pakistani, some who are both Indian and Pakistani; which can not be possible so this figure is not a proper explanation of the statements.

So only figure (i) is true and statement 3 is true among all the statement. **Answer: (3)**

MATHEMATICAL OPERATIONS

These types of problems are common to be asked in good competitive examinations. In these some mathematical operations are inter – changed among themselves such as if divide (÷) denotes multiplication (×), Greater to (>) denotes (+)" etc are the type of statements given and on the basis of those statements we have to solve a given problem.

Let us understand this in much wider concept with the help of an example.

Ex. If 'P' denotes 'divided by'; 'Q' denotes 'added to'; 'M' denotes 'subtracted from'; 'B' denotes 'multiplied by'; then 1 8 B 1 2 P 4 M 8 Q 6 = ?

(1) 108 (2) 46 (3) 17 (4) 52 (5) None of these

Sol. 1 8 B 1 2 P 4 M 8 Q 6

According to the given information put the signs assigned for each alphabet we get;

$= 18 \times 12 \div 4 - 8 + 6$

Now applying the concept of BODMAS to solve the above expression we get

$= 18 \times 3 - 8 + 6$

$= 54 - 2 = 52$ **Answer: (4)**

Ex: Some symbols have been given different meaning. Read them correctly carefully and find out the correct one out of the four alternatives

SIGNS

> Stands for ÷

v Stands for ×

< Stands for +

^ Stands for –

\+ Stands for =

– Stands for >

× Stands for <

(1) 5 v 4 < 2 + 10 v 2 < 2 (2) 8 v 4 – 2 + 5 > 7 ^ 6 (3) 8 v 6 – 3 + 4 > 7 ^ 6 (4) 9 v 3 – 1 + 6 > 8 ^ 9

Sol. 5 v 4 < 2 + 10 v 2 < 2 gives
5 x 4 + 2 = 10 x 2 + 2
22 = 22 **Answer: (1)**

EXAMPLE:

Directions for questions 1 – 5: In these questions, the symbols @, *, $, # and % are used with the following meanings as illustrated below:
'P @ Q' means 'P is neither greater than nor equal to Q'.
'P # Q' means 'P is not smaller than Q'.
'P * Q' means 'P is not greater than Q'.
'P % Q' means 'P is neither smaller than nor greater than Q'.
'P $ Q' means 'P is neither smaller than nor equal to Q'.
Now in each of the questions given below, assuming the given statements to be true, find which of the two conclusions I and II given below is/are definitely true?
Give your answer as –
(1) if only Conclusion I is true.
(2) if only Conclusion II is true.
(3) if only Conclusion I or II is true.
(4) if neither Conclusion I nor II is true.
(5) if both the Conclusion I and II are true.

1. **Statements:** T % B, M * B, J # B
Conclusions:
I. T & M II. T % J
2. **Statements:** V # D, D * K, F $ K
Conclusions:
I. D @ F II. V @ F
3. **Statements:** W # D, D % M, M * F
Conclusions:
I. D @ F II. F % D
4 **Statements:** H * R, R $ N, N @, K
Conclusions:
I. H @ K II. K $ R
5 **Statements:** M * J, K $ J, K @ T
Conclusions:
I. T $ M II. J @ T

Solutions 1 – 5:

1. T = B, M ≤ Q, J ≥ B ⇒ T ≤ J, M ≤ Q **Answer: (4)**
2. V ≥ D, D ≤ K, F > K
⇒ D ≥ K < F ⇒ F ⇒ D ≥ F ⇒ D @ F **Answer: (1)**
3 W ≥ D, D = M, M ≤ F
⇒ D ≤ F ⇒ D L F or D = F
⇒ D ≥ F or D = F
⇒ D @ F or D = F **Answer: (3)**
4 **Answer: (4)**
5 M ≤ J, K > J, K < T
⇒ M ≤ J < K < T ⇒ M < T
⇒ T > M ⇒ T ≤ M ⇒ T $ M
Also J < T ⇒ J ≥ T ⇒ J @ T **Answer: (5)**

VISUAL REASONING

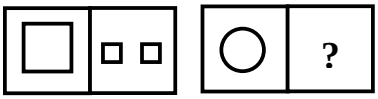
Instructions:

These are problems that are in the form of figures, drawings and designs. The problems may be in the form of series, analogies, classification, cube turning, turning, mirror image, paper folding, paper cutting, completion of incomplete pattern, figure perception, spotting the hidden designs or construction of square.

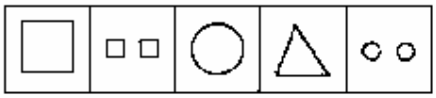
Analogies:

In these questions, there are two sets of figures viz. the problem figures and the answer figures. The problem figures are presented in two units. The first unit contains a pair of related figures and the second unit contains one figure and a question mark in place of the fourth figure. You have to establish a similar relationship between two figures and point out which one of the answer figures should be in place of the question mark.

Problem Figures



Answer Figures

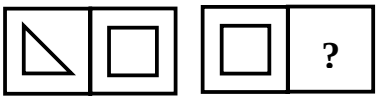


(1) (2) (3) (4) (5)

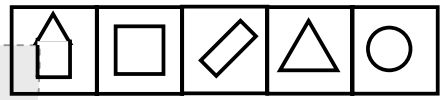
Consider the above problem figures. The second figure is related to the first figure in a certain way. That is the elements in the second figure are double the elements in the first figure. The first figure has one square and the second has two squares.

The third and fourth figures should also have the same relationship as the first and second have. That means that the fourth figure should have two circles.

Problem Figures



Answer Figures

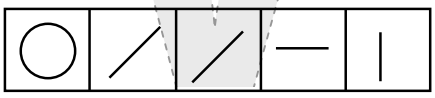


(1) (2) (3) (4) (5)

The first problem figure is made up of three lines and the second figure is made up of four lines. Thus the second figure has one line more than the first figure. As the third figure has four lines the fourth figure should have five lines. Therefore the answer is (1).

Classification:

In classification the problem figures themselves are the answer figures. Out of the five given figures tour are similar in a certain way. One figure is not like the other four. You have to identify the "odd man out".



(1) (2) (3) (4) (5)

In the figures given below, of the five figures tour are straight lines whereas one is a circle. Thus the circle is the "odd man out".

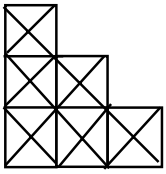
Series:

The four figures given at the left are the problem figures. The next five are the answer figures. The problem figures make up a series. That means they change from left to right in a specific order. If the figures continue to change in the same order what would the fifth figure be? In the example below, the line across the problem figures is falling down. Thus if the line continues to fall its fifth position would be lying flat i.e. it will be horizontal. Therefore the answer is (4).

Problem Figures **Answer Figures**

Figure perception:

In this type of problems, we have to count number of figures hidden in the given design.



For example:

1. The number of squares in the given figure is
   (1) 12 (2) 10 (3) 14 (4) 15

2. The number of rectangles excluding squares in the above figure is
   (1) 12 (2) 13 (3) 14 (4) 17

3. The number of triangles in the figure is
   (1) 54 (2) 48 (3) 69 (4) 70

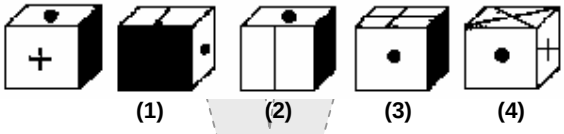
Upon studying the figure one can easily state that the answer to the first question is (3), that to the second question is (4) and to the third question is (3).

Cube turning:

In this type of problems we have to deal with different positions of the same cube.

For example:

The drawing on the left in each of the following figures represents a cube. There is a different design on each of the six faces of the cube. Four other drawings of the cube are lettered (1), (2), (3) and (4). Point out which one of the four could be the cube on the left turned to a different position. The cube on the left may have been turned over or around or over and around.

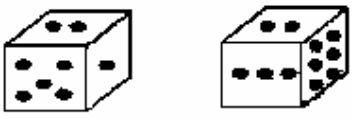


After studying all the choices, one can infer that the answer is (3).

Problems on Dice:

Sometimes we are given figures showing the same die in various positions. After looking at these figures, we have to find the number opposite a given number on the die. The procedure for finding such a number will be clear from the example given below.

Two positions of a block are given below. When one is at the top, which number will be at the bottom?



(1) 3 (2) 6 (3) 2 (4) 1 (5) 4

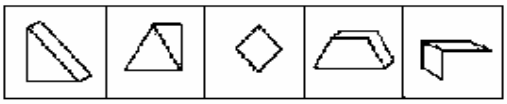
In both the figures 2 is at the top. To get the position of second figure, we have to rotate the dice in the first figure two time in clockwise direction. After rotating the dice two times in the same direction, 6 comes in the place of 1. So 6 is on the side opposite to the 1.

∴ Answer is (2).

Hidden Figure Test:

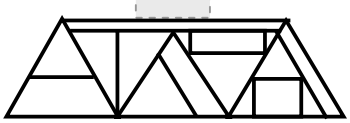
Hidden figure test is one more type of problem that one may encounter in visual reasoning. A simple figure is given. One has to identify it in more complex figures.

For Example:



(1) (2) (3) (4) (5)

Find the simple figures hidden in this complex figure.



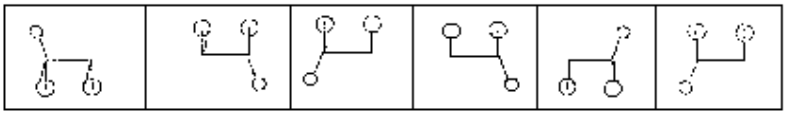
By inspection one can say that the figure (4) is hidden in the above figure.

Mirror Images:

In this type of problems the reflection of a design is seen in mirrors placed in different manners.

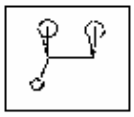
For Example:

A plane mirror is kept horizontally below the figure and then one kept on its side. Choose the correct image in the second mirror.

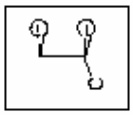


(1) (2) (3) (4) (5)

In the given problem the image of the question figure in the mirror kept horizontally below the figure is



The image of this in the mirror kept at the side of the first mirror is

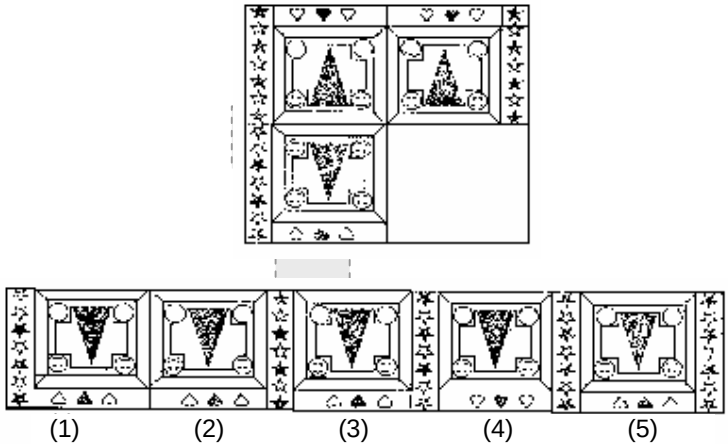


∴ Answer is (1).

Completion of Pattern:

In this type of problems we have to find out the missing part of the figure.

For Example:



After studying all the choices, one can infer that the answer is (5).

Paper Cutting:

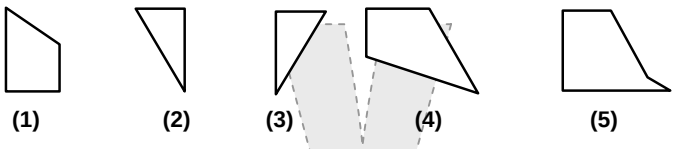
In this type of questions the manner in which the paper is folded is given. In the last figure, some marks are made. We have to select one of the figures from the set of five answer figures that would most closely resemble the paper when unfolded.

Construction of Squares:

In this given of problems we have to construct a square by combinations of three parts selecting them from the list of five different alternatives.

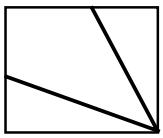
To solve this type of problems select a piece which contains a right angle between two adjacent outer edges. Try to fit another piece in its hollow spaces. If you can't, select another piece. Repeat the procedure with different sets of such pieces. Finally with the two pieces fitting into each other, find the last piece which fits into the other two selected ones, to make a completed square.

For Example:



(1) ABC (2) ABE (3) BCD (4) BDE (5) ABD

The square is

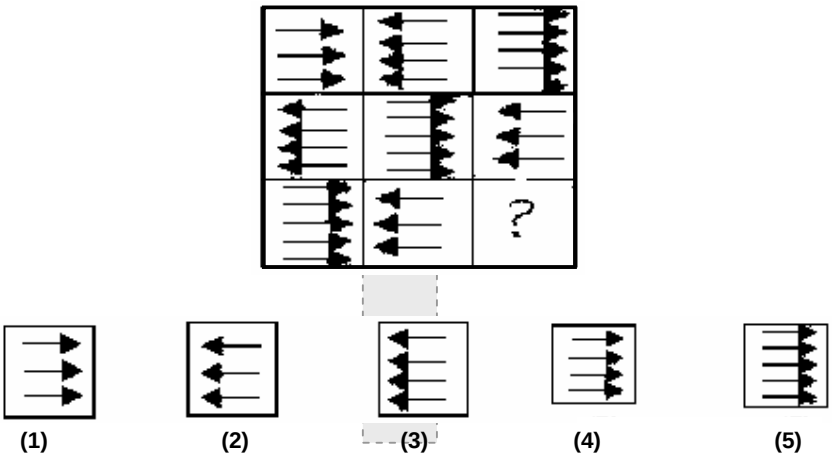


∴ Answer is (3).

Matrix:

In this type of questions we have to fill the matrix from the options given.

For example:



In the given matrix:

Number of arrow in first row is 3 – 4 – 5

Number of arrow in second row is 4 – 5 – 3

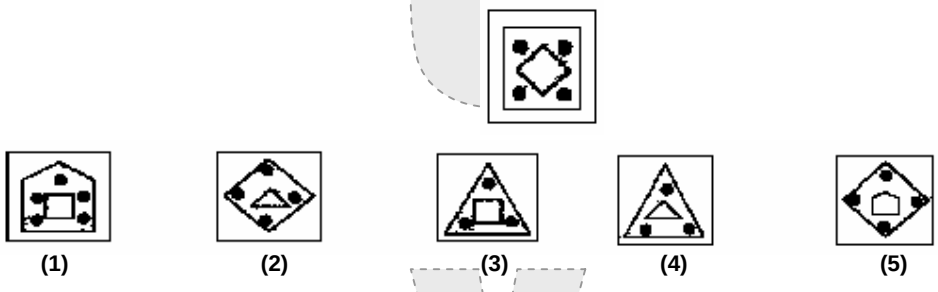
∴ Number of arrow in third row must be 5 – 3 – 4

Moreover direction of arrows changes after every cell in rows as well as in columns. So direction of arrows in the answer figure must be towards right hand side. ∴ Answer is (4).

Similar Quality:

In this type of questions we have to choose the figure which is most similar to the question figure.

For example:

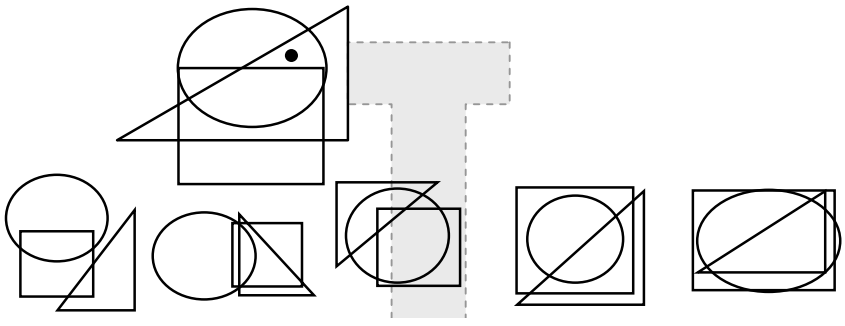


In the question figure there is a square inside the square and there is one dot at every corner of the larger square. Only option (4) shows the similar quality i.e. It has a triangle inside a larger triangle, with a dot at every corner.

∴ Answer is (4).

Dot Situation:

The problems on dot situation involve the search of similar conditions in the alternative figures as indicated in the problem figure. The problem figure contains dots in placed in the spaces enclosed between the combinations of square, triangle and circle. Selecting one of these dots we observe the region in the four alternatives. Once we have found it, we repeat the procedure for other dots, if any. The alternative figure that contains all such regions is the answer. For example:



(1) (2) (3) (4) (5)

In this case the dot appears in the portion which is common to the circle and the triangle but not to the square. In all the alternatives except (3) the circle and the triangle either don't intersect of the portion common to both of tem lies entirely inside the triangle.∴ Answer is (3).