

- Analogy is a comparison between one thing and another, typically for the purpose of explanation or clarification.
- A thing which is comparable to some thing else in significant respects.
  - A process of arguing from similarity in known respects to similarity in other respects.
  - A process by which new words and inflections are created on the basis of regularities in the form of existing ones.
  - Analogy is a literary technique in which two unrelated objects are compared for their shared qualities.

Ex: Photosynthesis does for plants what digesting food does for animals.

- Importance of Analogy
- Make abstract ideas more concrete
- These are some people – like teachers, professors, and technical writers – who explain difficult ideas for a living. It is a tough job. One way to make it easier is to draw analogies to things your readers or students are already familiar with. For ex: a biology teacher might explain the immune system by saying, 'what policemen do in a town, white blood cells do inside the body.'

#### Types of Analogy

- (i) Number Analogy
- (ii) Letter Analogy
- (iii) Word Analogy

- Number Analogy

Typical relationships between the numbers

- One number is a multiple of other.
- One number is the square root of the other.
- One number is the cube or cube root of the other.
- The two numbers can be consecutive, even, odd or prime numbers.
- In letter analogy, the relationship is between 2 groups of letters on each side of the sign:
- In word analogy, there is a certain relationship between the 2 given words on one side of '::' and one word is given on the other side.

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## SERIES

A series is a set of some number or letters arranged in some typical way or we can say that, a series is an informal speaking of number or letters.

In a series questions, you have to give some finite terms with one or a pair of terms missing and you have to complete the series by filling that missing term, based on the pattern of the question.

There are two types of Series:

1. Number Series
2. Letter Series

In comparison to Letter Series, Number series is more typical. To be good in Number series one must have the basic knowledge of numbers. For example, what are Natural Numbers, Rational Numbers, Whole Numbers etc. The Number Series questions are based on different patterns. Some of them are:

- Prime Number Pattern
- Square Number Pattern
- Cube Number Pattern
- Complex Multiplication Pattern etc.

For example: 1 2 4 8 32 256

In the above series, each number (except the first two) is a multiple of its previous two numbers.

$$1 \times 2 = 2,$$

$$2 \times 2 = 4,$$

$$4 \times 2 = 8 \text{ and so on.}$$

On the other hand, Letter series comes with tricks, mainly based on place value of alphabets or skipping of letters between two terms. So, it is clear that to be efficient in Letter series, one should memorize the place value of all alphabets i.e. A to Z (1 to 26).

The word EJOTY will help you to remember the place value of letters used in this word. They have place value in terms of multiples of 5, as shown below:

E --- 5

J --- 10

O --- 15

T --- 20

Y --- 25

...

'Puzzle' as clear from the name, make someone to feel confused because they are not able to understand something in that. Puzzles test our mental strength. Solving puzzles is one of the best mental exercise. If one does it regularly, one truly improves its mental strength over a period of time. One of the most important type of Puzzles is 'Number Puzzle' or 'Missing Number'.

Number puzzle is the one of the difficult section of Puzzles. To play with Number Puzzles, you must have strong Aptitude and mathematical skills. If you don't have these, then such abilities can only be developed with regular practice and consistent efforts.

Number puzzles are represented in many forms:

- a. Series Number Puzzles
- b. Matrix Puzzles
- c. Image Number Puzzles etc.

And they are based on Multiplication, Division, Square, Cube and some other tricky concepts.

In Present era, even most of the analytics companies evaluate candidates on their mental power for solving Puzzles (specially, Number Puzzles). For this, candidates should be creative and good with numbers.

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## CODING-DECODING

Coding-Decoding is one of the important topic of Reasoning. Coding-Decoding questions are frequently asked in SSC CGL exam.

Let us discuss about Coding-Decoding. Coding is a method of transmission of signals or messages between sender and receiver, it is done confidentially, specially for security reasons so that the third person cannot understand, comprehend or decode the sent message. The coded message can be decoded or decrypted by the receiver as he knows the pattern or method as how to interpret the message.

Now the question arises that why a student needs to study the chapter Coding-Decoding. So, the answer for this question is that Coding-Decoding is taught to the students to check or test their abilities to decrypt the pattern which is applied on coded message, break the code and come out with the real message.

➤ **Importance of Coding-Decoding:**

It is used in:

- (a) Alphabet Analogy
- (b) Alphabet Classification
- (c) Alphabet Series

➤ **Weightage of Coding-Decoding:**

Topic	Coding-Decoding	Alphabet Analogy	Alphabet Classification
No. of Questions	2-3	1-2	1-2
Marks	4-6	2-4	2-4

**Types of Coding-Decoding:**

➤ **Word Coding-Decoding:**

In word coding-decoding, the original alphabets of word are replaced by certain different alphabets according to some specific rule.

Example: If RACE is coded as XGIK, then how HAIR will be coded.

In above example, each letter of the word XGIK is 6 letters ahead of the letters of word RACE, so the code for HAIR will be NGOX.

➤ **Number Coding-Decoding:**

In number coding-decoding, alphabets are replaced by according to their place values, it may be Direct Place Value or Reverse Place Value. For example, 'A' has a direct place value '1' and reverse place value '26'.

Example: MNOP is coded as 4567.

In this example, Place value of M is 13.

Now,  $M \rightarrow 13 \rightarrow 1+3 \rightarrow 4$

Similarly,  $P \rightarrow 16 \rightarrow 1 + 6 \rightarrow 7$

➤ **Symbol Coding-Decoding:**

In symbol coding-decoding, analysis is done according to the given word. The letters or alphabets of the given word are replaced by certain symbols like  $\beta$ , @, n, % etc.

Example: In a certain language if WAVE is coded as 5%3 $\beta$  and WINS is coded as 59@@, then how SANE will be coded in that language.

In above example, as we considered both the given words we found that code for S is @, for A is %, for N is @ and for E is  $\beta$ .

Therefore, the code for the word SANE is @%@ $\beta$ .

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## **STUDY NOTES ON BLOOD RELATION**

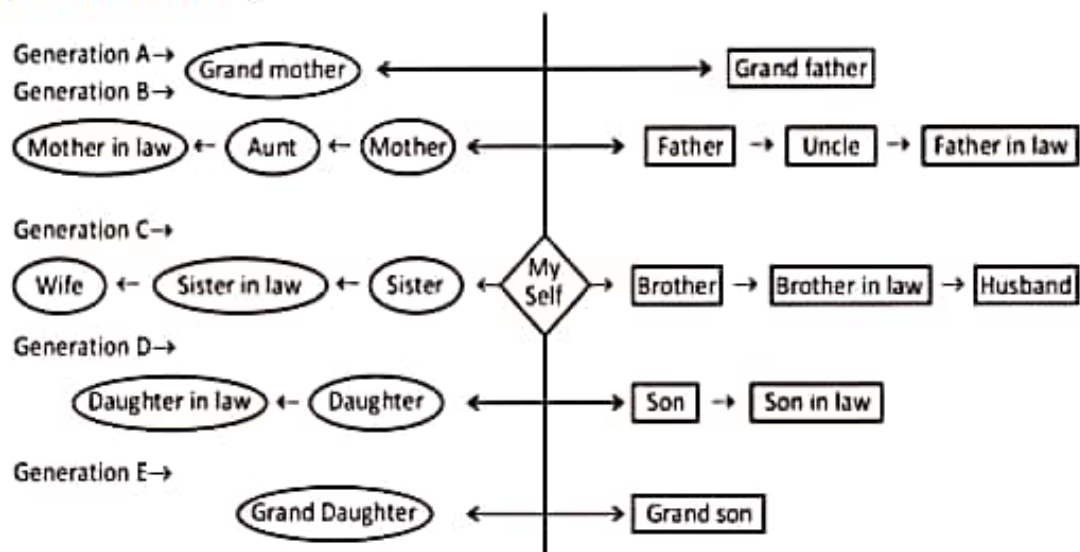
Problems on Blood Relation involve analysis of certain blood relations. In these types of problem, you should give proper attention to find out the correct relation. Some of the blood relation which are generally used in the question are given below in tabular form:

Mother's or father's son	Brother
Mother's or father's daughter	Sister
Father's brother	Uncle
Father's sister	Aunt
Father's Father	Grand father
Father's mother	Grand mother
Mother's brother	Daughter in law
Mother's Sister	Son-in-law
Son's wife	Sister in law
Daughter's Husband	Brother in law
Husband's or wife's brother	Nephew
Husband's or wife's sister	Niece
Brother's son	Brother-in-law
Brother's daughter	Sister-in-law
Sister's husband	Great Grand Daughter
Sister's wife	Great Grand Daughter
Grandson's daughter	Maternal Uncle
Granddaughter's daughter	Maternal Aunt
Mother's father	Maternal Grand Father
Mother's Mother	Maternal Grand Mother

### **Note:**

- If in a question it is not mentioned about paternal or maternal. By default, we consider paternal type.
- We cannot determine the gender of a person by name.
- Male are represented by (square) or + (plus) sign and female are represented by (circle) or 0 (minus) sign.

### GENERATION TREE:



#### Example 1.

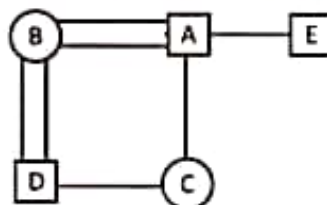
Pointing to a lady in the photograph, Shalu said, "Her son's father is the son-in-law of my mother." How is Shalu related to the lady?

**Solution:** Lady's son's father is lady's husband. So, the lady's husband is the son-in-law of Shalu mother, i.e. the lady is the daughter of Shalu mother. Thus, Shalu is the lady's sister.

#### Example 2.

A is father of C and D is son B.E is brother of A. If C sister of D, how is B related to E?

**Sol.** For these types of question, we can use generation tree.



So, B is sister in law of E'

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## STUDY NOTES ON ALPHABET TEST

"Alphabet Test" is considered to be quite important and every year a good number of questions are asked from this section. We are providing you with Basic Concepts & Tricks to Alphabet Test related Questions in reasoning which will surely help you in the upcoming RRB and other competitive Exams.

### Basic Concepts & Tricks to Alphabet Test

In this type, the question asked are based on finding the place of an English letter to the left or right of another English letter in the alphabetical order. Sometimes the Question are based on finding the number of English letter(s) between two different English letters.

This type of question vary on the arrangement of alphabetical order. It can be Backward, first half backward, second half backward, multiple letter segments in changed order etc. Some of the question asked are based on finding the middle letter of two specified letters and in some questions it is asked that which letters do not change their place after alphabet arrangement.

So, the detailed explanation with examples is as follow:

#### 1. Place of letter in forward order

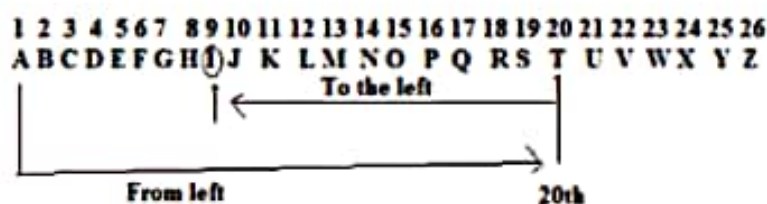
In this type of questions the exact letter has to be found out with the help of direction of place given in the question. The example discussed as below will give you a better idea about this type of questions.

**Ex 1: Find the 11<sup>th</sup> letter to the left of 20<sup>th</sup> letter from left in the English alphabet.**

- (a) D (b) J  
(c) K (d) I

**Solution: (d)**

Let us see



Hence, 11<sup>th</sup> letter to the left of 20<sup>th</sup> letter from left is I.

#### Alternate Method

In English alphabet 11<sup>th</sup> letter to the left of 20<sup>th</sup> letter of your left =  $(20-11)$  th letter from the left = 9<sup>th</sup> letter from the left = I

## 2. Place of Letter in Completely Backward Order

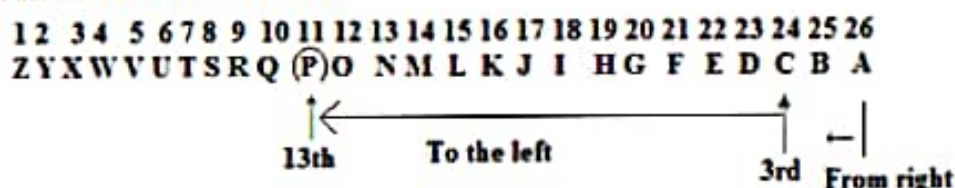
In such questions the order of letters is completely reversed or they are counted from Z to A and then the place of letter is asked with the help of direction.

Ex 2: If English alphabet is written in backward order, then what will be 13<sup>th</sup> letter to the left of the 3<sup>rd</sup> letter from right?

- (a) P (b) N  
(c) R (d) Q

Solution: (a)

Backward order is written as



Now, the 13<sup>th</sup> letter to left of the 3<sup>rd</sup> letter from right is P.

### Alternate Method

In backward order of alphabet, 13<sup>th</sup> letter to the left of the 3<sup>rd</sup> letter of your right = (3+13) th letter from right = 16<sup>th</sup> letter from right = P.

## 3. Place of a Letter When First Half is in Backward Order

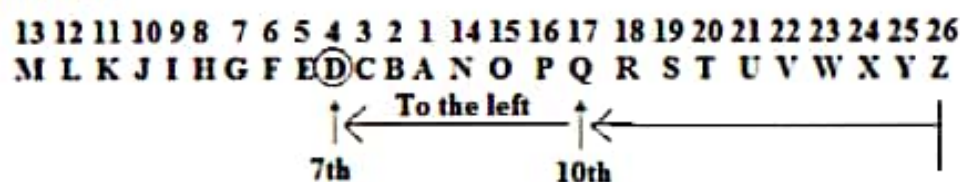
In such type of question, only the 1<sup>st</sup> half of the order of alphabetical series is reversed and remaining are left unaltered i.e., order of A to M is reversed and then questions related to position of letter are asked.

Ex 3: If 1<sup>st</sup> half of the English alphabet is written in backward order, then what will be the 7<sup>th</sup> letter to the left the 10<sup>th</sup> letter from your right?

- (a) C (b) E  
(c) D (d) J

Solution: (c)

Let us see



The 7<sup>th</sup> letter to the left of 10<sup>th</sup> letter from our right is D.

## 4. Place of a Letter When Second Half is in Backward Order

In such type of questions the 2<sup>nd</sup> half is reversed i.e., from N to Z and remaining are kept as it is and then questions related to place of English alphabet are asked.

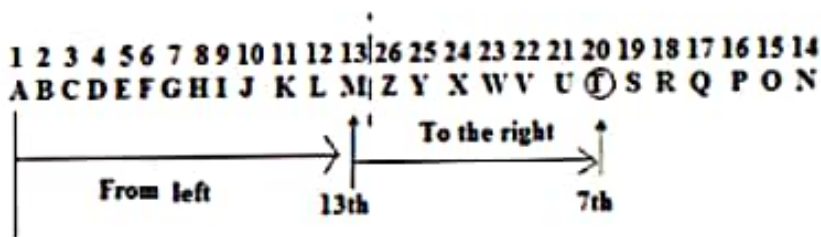


**Ex 4:** If 2<sup>nd</sup> half of the English alphabet is written in backward order, then what will be the 7<sup>th</sup> letter to the right of 13<sup>th</sup> letter from your left?

- (a) T (b) U  
(c) V (d) S

**Solution: (a)**

Let us see



The 7<sup>th</sup> letter to the right of 13<sup>th</sup> letter from our left is T.

### 5. Multiple Letter Segment in Backward Order

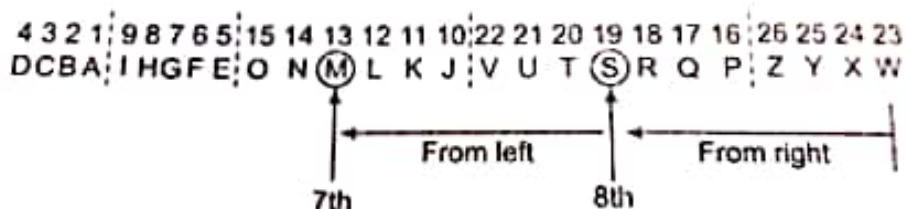
In such type of questions, no specified order of change is followed in alphabetical order. They are changed according to the condition given in particular question.

**Ex 5:** If first four letters of the English alphabet are written in reverse order; again next 5 letters are written in reverse order; again next 6 letters are written in reverse order; next 7 letters are written in reverse order and finally, the remaining letters are also written in reverse order, then what will be the 7<sup>th</sup> letter to the left of the 8<sup>th</sup> letter from right?

- (a) M (b) N  
(c) O (d) L

**Solution: (a)**

Let us see the arrangement

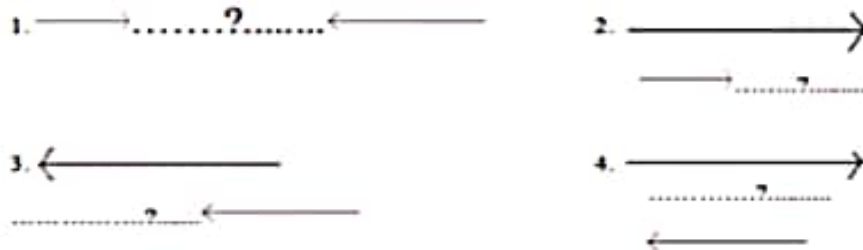


The 7<sup>th</sup> letter to the 8<sup>th</sup> letter from right is M.

## 6. Number of Letter in the Middle of Two Letters

In this particular type, question asked to calculated the total number of English letters between any two specified letter as directed in the question.

Four situations can be created under these type of problems

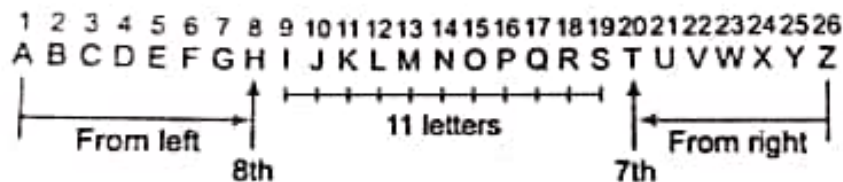


**Ex 6:** How many letters are there between 8<sup>th</sup> letter from left and 7<sup>th</sup> letter right in the English alphabet?

- (a) 7 (b) 11  
(c) 8 (d) 9

**Solution: (b)**

Let us see



There are 11<sup>th</sup> letters between 8<sup>th</sup> letter from left and 7<sup>th</sup> letter from right.

### Alternate Method

Total number of letter in the English alphabet = 26

Required number of letters =  $26 - (8 + 7) = 11$

## 7. Middle Letter between Two letters

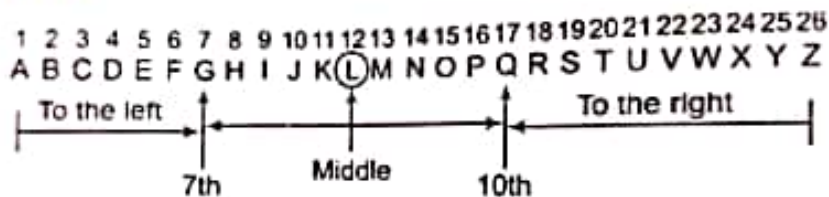
In these types of questions, it is asked to find the middle letter the two specified letters of English alphabet.

**Ex 7: Which letter is in the middle of 7<sup>th</sup> letter from left and 10<sup>th</sup> letter from right in the English alphabet?**

- (a) L (b) P  
(c) M (d) Q

**Solution: (a)**

Let us see



Letters between G and Q is L.

**Alternate Method**

10<sup>th</sup> letter from right =  $27 - 10 = 17^{\text{th}}$  letter from left.

Required middle letter =  $7 + (17-7)/2 = 24/2 = 12^{\text{th}}$  letter from left = L

**8. Same Position of Alphabet after Arranging Alphabetically**

In this type of questions, a word is given and then asked how many letters remain same in their position, if they are arranged in alphabetical order.

**Ex 8: How many such letters are there in the word 'CADMP' which remain same in their position, if they are arranged in alphabetical order?**

- (a) One (b) Two  
(c) Three (d) Four

**Solution: (c)**

Original word	C	A	D	M	P
Rearrangement	A	C	D	M	P

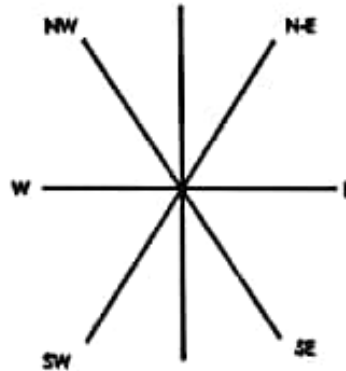
So, such type of letters are D, M and P.



## **DIRECTION SUMMARY**

As we all now, there are four main directions North, South, East and West. Apart from these, there are four cardinal directions, they are:

- North-East
- North-West
- South-East
- South-West



Direction is a part of Verbal Reasoning. The questions came under this topic are commonly based on direction of movement and the distance travelled by the person. If the person takes right turn then he is moving in clockwise direction and if takes left turn then moving in anti-clockwise direction. In questions a person is moving in different directions, clockwise or anti-clockwise direction and covered a particular distance, you have to find out either the final direction of the person or the distance between the starting point and the ending point.

Another pattern on which direction questions based is Sunrise and Sunset. On sunrise, the shadow of the person is in west direction whereas on sunset, shadow is in east direction. On sunrise, if a person is facing north, then his shadow is towards his left and if facing south, then towards right. On the other hand, on sunset, if a person is facing north then his shadow is towards right and if facing south, then towards left.

In exams, direction questions are not normally very difficult but the advance level questions of this topic may have some complexity.

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## **RANKING SUMMARY**

Rank means, a particular place occupied by any particular object or person in a given order. In reasoning, ranking means arrangement of different objects or people in ascending or descending order. Arrangement can be done either in vertical or horizontal direction based on different parameters like age, marks, weight, number of items, height etc.

In competitive exams, questions on ranking are asked in different ways. In one of the ways, you are given the position of a one person from one end and you have to tell the position from the other end. In another type of questions, positions of two persons are given and later their positions are interchanged and you are required to tell either the number of total person or position of the any of the person from either end of the row. Apart from row arrangement, questions of circular arrangement may be given in exams. The weightage of ranking questions is one to two.

Questions of different variations are asked in exams, so you have to need a good practice by going through various assignments and test series.

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## VENN DIAGRAM SUMMARY

Venn Diagrams are representation of components of different groups or divisions or we can say that different categories. It is the way to show the simple or complex relationship between different categories or groups. Given groups have no common elements or sometimes, some or all group have common elements. Such relationships are shown by geometrical figures, like circle, ellipse, triangle, rectangle, square etc.

Some basic cases of Venn Diagrams are shown below:

1. Three types of groups with no common element.



2. Three groups, in which two are inter-related and one has no relation with them.



3. Series of subgroups one under another.



4. Three groups, one main group, two subgroups and both have some common elements.



In exams, questions can be asked in two ways, either you will be given Venn Diagrams and you have to answer by examine them or you have to select particular venn diagram option among the given alternatives based on the given information. Venn Diagrams is a complex but interesting topic and one needs good practice to score in this section.

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## CLOCK

A clock is an instrument which indicates time in seconds, minutes and hours. In one day there are 24 hours, in one hour 60 minutes and each minute contains 60 seconds. Clock is very important for us; it helps us to manage or schedule our tasks all through the day. Clock consists of total three hands. The two main hands of a clock are hour-hand and minute-hand. Some basic concepts of clock are:

- The hour-hand revolves  $360^\circ$  in one day whereas the minute-hand revolves  $30^\circ$  in every 5 minutes and  $360^\circ$  in a day.
- The maximum angle between hands is  $180^\circ$ , where two hands are in a straight line.
- The minimum angle between hands is  $0^\circ$ , where two hands overlap each other.

The types of questions asked in reasoning section from this topic are based on:

- Angle between two hands at a particular time.
- Time in a clock at particular angle.
- Reflex angle.
- Number of times a particular angle made by hands in a day.

Questions from this topic have not much weightage in competitive exams, but on an average there is one question of clock in exams. If all the basic concepts of clock are clear, then you can solve the questions easily.

A calendar is a representation which shows the day, date, weeks and months of a particular year. A normal year consists of 365 days, 5 hours, 48 minutes. There are 12 months in a year, each month contains 4 weeks and 2 to 3 odd days (except February) and each week contains 7 days.

Two most important terms of this topic are Leap Year and Odd Days. Let us discuss these two topics in detail:

### LEAP YEAR:

- Every year which is completely divisible by 4 is called Leap year. For example, 1560, 1972 etc.
- Every century year which is completely divided by 400 is also called Leap Year. For example, 400, 1200, 2000 etc.
- In a Leap year, there are 366 days i.e. one day more than the normal year and that day is 29<sup>th</sup> February.

### ODD DAYS:

- Additional days from a total number of weeks in a particular month are Odd days.
- Month having 31 days, has 3 odd days.
- Month having 30 days has 2 odd days.
- The simplest way, to know the number of days is to divide the given number of days by 7.
- A normal year (365 days) has 1 odd day.
- A leap year (366 days) has 2 odd days.
- 100 years have 5 odd days.
- 400 years have 0 odd days.

The questions from this topic are come off and on in all competitive exams. One has to memorize the codes of months, weeks and century years to solve these questions.



## CLOCK & CALENDAR

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## ARITHMETIC REASONING

Arithmetic reasoning, as it clears from the name that this topic contains both aptitude and reasoning. It is one of the interesting topic of the Logical Reasoning, as it requires good calculation and special sense of reasoning.

One cannot ignore or skip this topic while preparing to get the selection as this section has good weightage in exams. Total excepted question from this topic are 2-3. Topics of aptitude covered in this topic are:

- Average Speed
- Ages
- Ratio and Proportion
- Speed, Time and Distance
- H.C.F and L.C.M
- Cost Price and Selling Price etc.

This topic tests your mental as well as logical sense. You cannot give answer only by applying the direct formula as you do in mathematics.

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## MATHEMATICAL OPERATIONS SUMMARY

Mathematical operation is a part of reasoning section in which questions are based on mathematical functions. There are mainly four basic functions in mathematics; these are Addition, Subtraction, Multiplication and Division. Apart from these some other symbolic functions are also used, like 'is equal to', 'greater than', 'less than' etc.

It is an important part of the reasoning section for any competitive exam. In these types of questions manipulation of symbols or numbers is done. One has to solve the questions according to given information. One must follow the VBODMAS rule while solving the mathematical operations.

Manipulation is done in many ways. In one type of questions you are given a mathematical equation consists of numbers and mathematical functions and function are represented in different form, like '+' means division, '-' means multiplication etc. In second type, along with symbols, manipulation of number is also done. For example, you are given an equation  $2 + 3 \times 9$  and you are asked to interchange 2 with 3 and '+' with 'x' and vice versa.

It is time consuming section of reasoning and you have to need good practice of these types of questions. One must solve these questions efficiently by going through options. It depends on your smart vision that which option you choose first.

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## Puzzle

### Introduction

It can be asserted that the questions on 'Puzzle' can be generally classified into the following:

- Simple problems of categorization
- Arrangement problems
- Comparison problems
- Blood relations
- Blood relations and professions
- Conditional selection
- Miscellaneous problems

### Some Preliminary Steps:

- I. First of all, take a quick glance at the question. This would need not more than a couple of seconds. After performing this step, you would develop a general idea as to what the general theme of the problem is.
- II. Next, determine the usefulness of each of the information and classify them accordingly into 'actual information' or 'useful secondary information' or 'negative information' as the case may be. This can be done in the following way:
  - A. **Useful Secondary Information:** Usually the first couple of sentences of the given data are such that they give you some basic information that is essential to give you the general idea of the situation. These can be classified as useful secondary information.
  - B. **Actual Information:** Whatever remains after putting aside the useful secondary information can be categorized as actual information. While trying to solve a problem, one should begin with the actual information while the useful secondary information should be borne in mind.
  - C. **Negative Information:** A part of the actual information may consist of negative sentences or negative information. A negative information does not inform us anything exactly but it gives a chance to eliminate a possibility.

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## **Assumptions**

An assumption is something which is assumed, supposed and taken for granted. When somebody says something he does not put everything, every aspect of his idea into words. There is a lot which he leaves unsaid. That which he leaves unsaid, that which he takes for granted, may be defined as an assumption.

Some Standard Types of Assumptions (Validity of a Given Assumption)

**Following are the standard categories of assumptions:**

### **A) Existence/ Non-existence of the subject**

This category makes a very simple assumption that what is being talked about must be existing. Similarly, if its absence is being talked about, it must not be existing.

### **B) Adjectives**

We know that an adjective is something which denotes a quality of the subject. Naturally then, if an adjective is assumed that "the subject does have the quality as denoted by the adjective"

### **C) Cause-effect**

Some statements mention a cause-and-effect relationship. The conjunctions between the clauses are usually 'therefore', 'as', 'hence', 'thus' etc. In all such cases it would be a valid assumption to say that "this cause leads to this effect".

### **D) Analogy**

In some cases it is concluded that because a cause leads to some effect in one type of objects, it will also lead to the same effect in another type of objects.

### **E) Advertisement/notices/appeals**

In the cases of advertisements, notices, appeals etc. following assumption will be considered valid.

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## **COURSE OF ACTION**

A course of action is a part of verbal reasoning. In these questions, a statement based on particular situation is given, along with two or more possible course of actions. We have to choose the one among them, which is practically or logically supports the given statement. Statements given are based on different facts, judgments, conclusion and practical vision.

A course of action is asked to test the analytical decision making skill at the point of time. In course of action one must need a logical concept in mind. One can answer the question correctly with unbiased and neutral mind. Individual perception and impractical concepts obstruct the one to judge the right course of action. To solve the problem one should identify the root cause of the statement. A right course of action always seems to be lessen, reduce or minimise the problem given in the statement, this can help you to choose the right option.

The level of these type of questions is moderate to difficult, in different competitive exams. Sometimes you can find it difficult or complex to select the appropriate course of action. But with practice and logical mind frame, you can do it easily.

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## DATA SUFFICIENCY

Data Sufficiency is an important topic in almost all competitive exams. As we all know, time is one of the most important factors in exams, but questions of data sufficiency require some time. One must not be a guesser or in a hurry while solving these questions. Each question of this topic consists of a question with two statements numbered I and II. One has to analyse the problem, read the given statements and give answer:

1. If data in statement I alone are sufficient, while the data in statement II alone are not sufficient to answer the question.
2. If data in statement II alone are sufficient, while the data in statement I alone are not sufficient to answer the question.
3. If data in either I alone or in II alone are sufficient.
4. If data in both I and II together are not sufficient.
5. If data in both I and II together are necessary to answer.

Questions of Data Sufficiency are based on some typical cases like:

- Relations
- Ages
- Comparison etc.

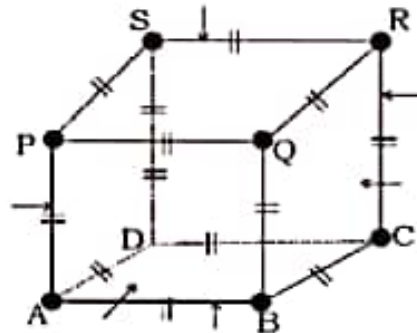
Comparison is done between two or more persons or things. One needs to carefully read the question and solve both the statements thoroughly to get the right option.

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## DICE

As we all know Dice is a part of the one of our popular Indoor game since immemorial times. Presently, It is one of the interesting chapters of Reasoning and also included in the syllabus of SSC CGL EXAM.

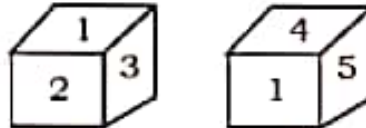
Now, let us discuss about Dice in detail. Dice is a three-dimensional figure in which there are 6 Surfaces, 12 Edges and 8 Corners. There are 4 adjacent surfaces to each surface.



Here, '≡' represents Edges  
'•' represents Surfaces  
and, '•' represents Corners

In exams two or more positions of a dice are given in a question and your task is to find out the opposite surface of a given surface.

Example:

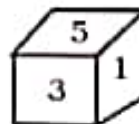


From the above two positions of a dice it is clear that 2,3,4 and 5 are the adjacent surfaces of surface '1'. Therefore, we can say that opposite surface of '1' is surface '6'.

### TYPES OF DICE

**I. STANDARD DICE:** The dice in which the sum of two opposite surfaces is equal to seven is considered as Standard Dice.

For Example:



In the above dice, 5,3 and 1 are adjacent surfaces and it is clear that the sum of any two surfaces shown in dice is not equal to seven.

Therefore, Surface opposite to '5' is Surface '2' (i.e.  $5 + 2 = 7$ )

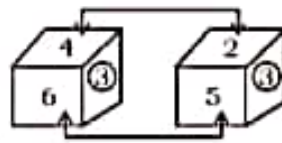
Surface opposite to '3' is Surface '4' (i.e.  $3 + 4 = 7$ )

Surface opposite to '1' is Surface '6' (i.e.  $1 + 6 = 7$ )

**II. GENERAL DICE:** In General Dice the sum of two opposite surfaces is not equal to seven. To find out the opposite surface we are required at least two positions of dice having:



**(a) one surface common**



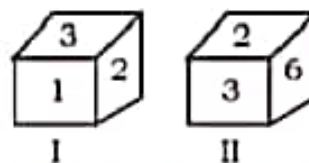
Here, Surface '3' is common surface in both the positions of dice. After fixing '3' and then moving in clockwise direction we can easily find the opposite surfaces.

3 - 6 - 4

3 - 5 - 2

It is clear that 6 and 5 are opposite surfaces and, 4 and 2 are opposite surfaces. Therefore, surface opposite of surface '3' is surface '1'.

**(b) Two surface common**



In the above two positions of dice, two surfaces i.e. Surface '3' and Surface '2' are common.

3 - 2 - 1

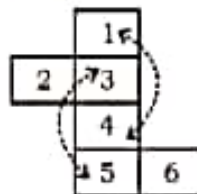
3 - 2 - 6

After fixing surfaces 3 and 2, we find that surface opposite of surface '1' is surface '6'.

Surface opposite of surface '3' is not confirm, it may be surface '4' or surface '5'. Similarly, surface opposite of surface '2' is not confirm, it may be surface '5' or surface '4'.

**III. OPEN DICE:** In open dice all the six surfaces are clearly shown. The opposite surfaces are at the alternate positions of rows or columns.

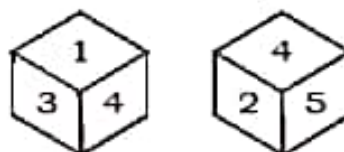
For Example:



Here,  
 opposite of surface '1' is surface '4'  
 opposite of surface '3' is surface '5'  
 opposite of surface '2' is surface '6'

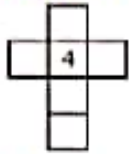
➤ **EXPANSION OF DICE:** In expansion of dice we are given two or more positions of dice and we have to represent all the six surfaces in open dice.

For Example:

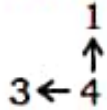


In the above two positions of dice common surface is '4'.

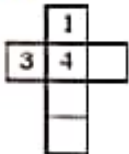
Always fix the common surface at the centre position.



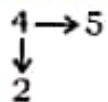
From first position:



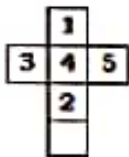
i.e.



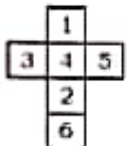
From second position:



i.e.



Clearly blank surface will be filled by remaining number i.e. '6'



Therefore, opposite surfaces are:  $1 \leftrightarrow 2$ ,  $4 \leftrightarrow 6$  and  $3 \leftrightarrow 5$

> **WEIGHTAGE:**

In exam 1-2 questions of Dice are asked carrying 2-4 marks. Questions are generally from General Dice and Open Dice.

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## CUBE

A cube is a 3-Dimensional Geometry, having

6 – Surfaces

12 – Edges

8 – Corners

In exam, there are some questions belongs to different categories and based on topic cube. We can solve all the questions with some basic concepts or with the help of some formulas. Generally, we have given one cube which is coloured with one or more than one colour. It is then divided into small cubes in different patterns and we have to find out zero surface, one surface, two surface or three surface coloured cubes.

Following are some important points to solve such questions:

1. One surface coloured cube:  $(a-2)^2 \times \text{number of surfaces}$ .
2. Two surface coloured cube:  $(a-2) \times \text{number of edges}$ .
3. Three surface coloured cube:  $(a-2)^3$ .

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## **PAPER FOLDING & PAPER CUTTING**

Paper Folding & Paper Cutting is a topic comes under Non-Verbal Reasoning. As by the name, it looks that they are two topics but actually they are two parts of one particular type of question.

### **Paper → Folded → Cut/Punched → Unfolded**

Above is the pattern which is followed for the questions comes under this topic. In this part questions are little confusing and requires a sharp visual vision and more practice.

Questions of this topic are depend on visual vision and limited to word knowledge. In exams, three or more figures are given in the question figure part. First, the paper is folded two or more times and then after the final fold, paper is cut or punched. An applicant has to choose an option among the given alternatives which shows the correct vision after the paper is unfolded.

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### **SYLLOGISM SUMMARY**

Syllogism is form of reasoning in which a conclusion is drawn from two given proposition. It is deductive reasoning rather than inductive reasoning. In these type of questions some statement are given followed by some conclusion. A Proposition is a sentence that makes a statements and gives a relation between two terms -

- a. Subject
- b. Predicate.

A subject is that part of the proposition about which something is being said. A predicate on the other hand is that term of the proposition which is stated about or related to the subject.

Your work is to decide which conclusion is correct and which is not. There are so many varieties of questions; it could be two statements and two conclusion or more than that. In order to solve questions, first the candidate should convert the statement in venn diagram.

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