

Examrace

Method of Mathematical Reasoning and Aptitude for Paper 1 Unit V (Mathematical Reasoning and Aptitude) as Per New 2021 Syllabus

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Mathematical Reasoning and Aptitude: Mathematical Induction

- The word 'induction' means to generalization a statement from some given facts.
- The principle of mathematical induction is a techniques to establish the truth of a given mathematical statement which has been formulated on terms of the natural number 'n' .
- Assume that the statement is $p(n)$ which has an association with some positive integer 'n' .
- Step 1 involves an examination of the statement for $n = 1$
- In step 2 it is assumed that the statement is true for a positive integer 'k' .
- In step 3, the truth of $p(k + 1)$ is established.

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Deductive Reasoning

- Statement
 - Any statement is an acceptable mathematical statement if it is either a true statement or a false statement, but it cannot be both. It is generally denoted as an alphabet followed by a colon & then the statement.
- Compound statement
 - A combination of multiple mathematical statements through some logical.
- Negation of a statement
 - If any statement is denied being true, then that is the statement.
 - If a statement is denoted by 'p' then negation is denoted by ' $\sim p$ ' .

Logical Operations

- The compound statements are connected by some logical operations. These logical operations are denoted by some special phrases, also called as connectives.
 - 'And' operation
 - If each of the component statement in a compound statement is 'true' then the compound statement is 'true' . Even if any one of the statement using is 'false' , the

compound statement is 'false' . It is denoted by ' \vee ' .

- 'Or' operation
 - If anyone (or more than one) component statement of a compound statement is/are true, then the compound statement is 'true' . The compound statement using 'or' is 'false' only if all the component statements are false. It is denoted by ' \wedge ' .
- Implies
 - A compound statement 'a' implies 'b' means that the statement 'a' is enough condition for statement 'b' & vice-versa. It is denoted by p is q.

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Mathematical Reasoning and Aptitude: How to Identify Common Patterns in Number Series

- The common patterns asked in number series topic are-
 - Arithmetic series
 - This could be of two types. In which the next term is obtained by adding/subtracting a constant number to its previous term. Common key is the key here
 - Example: 4, 9, 14, 24,29, 34 [in the given series pattern is continued by adding 5 to the last number each time]
 - Furthermore this could be mixed with arithmetic with the differences of consecutive numbers themselves form an arithmetic series.
 - Example: 1, 3, 6,10, 15
 - Example: 1, 3, 6,10, 15 [In the given series $3 - 1 = 2, 10 - 6 = 4, 15 - 10 = 5 \dots$. Now, we get an arithmetic sequence 2,3, 4,5]
 - Geometric sequences is multiplying by the same value each time.
 - Prime numbers
 - Squares/cubes
 - Pattern in differences
 - Pattern in alternate numbers
 - As the name of the series specifies, this type of series may consist of two series combined into a single series. The alternating terms of this series may form an independent series in itself.
 - Example: 3, 4, 8, 10,13, 16? ?

- As we can see, there are two series formed → series 3,8, 13 with a common difference of 5
- → series 2: 4,10, 16 with a common difference of 6
- So, next two terms of the series should be 18 22 respectively.

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