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Best Quality Classroom Topper Hand Written Notes to Crack GATE, IES, PSU's & Other Government Competitive/ Entrance Exams

**MADE EASY
COMPUTER SCIENCE
Topper Handwritten Notes
DISCRETE MATHEMATICS
BY-SRINIWAS SIR**

- Theory
- Explanation
- Derivation
- Example
- Shortcuts
- Previous Years Question With Solution

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Topics

① Set theory (4 marks) (36 hrs)

- Sets
- power set
- Venn diagram
- multiset
- Relations
- types of relⁿ
- partial order
- Lattice

function

- Types of funⁿ
- funⁿ composition

• Groups

② Combinations (15 Hrs) (2 marks)

• Counting

- principle of inclusion & Exclusion
- Euler's funⁿ ($\phi(n)$)
- Derangement (D_n)
- permutation & combination
- pi geonhole principle
- generating funⁿ
- Recurrence Relations

- 100 pages notebook
- i) Recursion - P
 - ii) Computer design

③ Graph Theory (10-12 hrs)

- Connectivity
- Matching
- Coloring

④ Mathematical Logic (8 hrs) (2 marks - 3 marks)

- Propositional logic
- first order logic

Set

- Collection of well defined unordered distinct object.

eg1. The collection of all tall boys in the class

→ It is not a set because we don't know that which height can treat as tall.

So, The rollⁿ of all tall boys whose height ≥ 165 cm, in the class
It is a set.

eg2. How many of the follⁿ sets are equal?

- The collection of all letters of "follow"
 $A = \{f, o, l, l, o, w\}$
- The rollⁿ of all letters of "flow"
 $B = \{f, l, o, w\}$
- The " " "C = $\{w, o, l, l, o, f\}$

$\therefore A = B = C$

Null Set — The set which does not contain any element is called null set.

• Denoted by ϕ or $\{ \}$

• Cardinality of null set $|\phi| = 0 = | \{ \} |$

• The set which contain ϕ as a element, the cardinality

$| \{ \phi \} | = 1$

Subset → Let A, B are two sets if every element of 'A' is also an element of 'B' then we can say that

$A \subseteq B$ (A is subset of B)

eg. $A = \{1, 2, 3\}$, $B = \{x | x \in \mathbb{N} \ \& \ 1 \leq x \leq 5\}$
 $= \{1, 2, 3, 4, 5\}$

• $A \subseteq B$

$A \subseteq B \begin{cases} \text{A C B} \\ \text{(OR)} \\ \text{A = B} \end{cases}$

NOTE - If we know the B contain some extra element then we can write $\rightarrow A \subset B$ (A is proper subset of B)

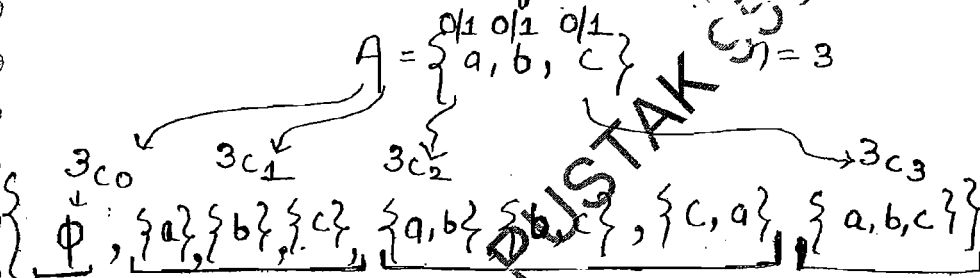
NOTE \rightarrow

1. ϕ is subset of every set.
2. Every set is subset of itself

- Power set = 10Q
- Venn diagram = 5Q

Power set \rightarrow The "coll" of all possible subset of a given set is called power set.

- The power set of set 'A' is denoted by $P(A)$
- power set is set of sets



$${}^n C_0 + {}^n C_1 + {}^n C_2 + \dots + {}^n C_n = 2^n$$

$$|P(A)| = {}^3 C_0 + {}^3 C_1 + {}^3 C_2 + {}^3 C_3 = 2^3 = 8$$

If $|A| = n$, then $|P(A)| = {}^n C_0 + {}^n C_1 + \dots + {}^n C_n = 2^n$

Possibilities \rightarrow

	0/1	0/1
	x_1	x_2
\rightarrow	0	0
\rightarrow	0	1
\rightarrow	1	0
\rightarrow	1	1

$4 = 2^2 = 2^n$
 possibility $\left\{ \begin{array}{l} \text{no. of element} \end{array} \right.$

3 possibilities of two elements $\left. \vphantom{\begin{array}{l} 3 \\ 2 \\ 1 \end{array}} \right\} = 3^2$

$8 = 2^3$