HindPhotostat

GET IT ON Google Play

Hind Photostat & Book Store

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

Topics

1. Settheory (4marks) (36hrs)

- Sets
  - powerset
  - Venn diagram
  - multiset
- Relations
  - types of relⁿ
  - partial order
  - Lattice
- function
  - Types of funⁿ
  - funⁿ composition
- Groups

2. Combinatorics (15 Hrs) (2 marks)

- Counting
  - principle of inclusion & Exclusion
  - Euler's funⁿ ($\phi(n)$)
  - Derangement (D_n)
  - permutation & Combination
  - pigeonhole principle
  - generating funⁿ
  - Recurrence Relations → 200 pages notebook
    i) Recursion - P
    ii) Compiler design

3. Graph Theory (10-12hrs)

- Connectivity
- Matching
- Coloring

4. Mathmetical logic (8hrs) (2marks - 3marks)

- Propositinal 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 coll^n of all tall boys whose height ≥ 165 cm, in the class it is a set.

eg2 How many of the foll^n sets are equal?

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

$\therefore A = B = C$

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

- Denoted by ϕ or $\{\}$
- Cardinality of null set $|\underbrace{\phi}_{\text{null set}}| = 0 = |\{\}|$
- The set which contain ϕ as a element, the cardinality
  $|\underbrace{\{\phi\}}_{\text{set with a null element}}| = 1$

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: $A = \{1, 2, 3\}$, $B = \{x \mid x \in N \ \& \ 1 \le x \le 5\}$
$= \{1, 2, 3, 4, 5\}$
$\therefore A \subset B$

$A \subseteq B$ — $A \subset B$ (OR) $A = B$

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

NOTE →

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

- Power Set : 10Q
- Venn diagram = 5Q

Power set → The coll^n 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

$A = \{a, b, c\}$ $n = 3$

$^3C_0$ $^3C_1$ $^3C_2$ $^3C_3$

$\{\phi, \{a\}, \{b\}, \{c\}, \{a,b\}, \{b,c\}, \{c,a\}, \{a,b,c\}\}$

$^nC_0 + {}^nC_1 + {}^nC_2 + \dots + {}^nC_n = 2^n$

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

If $|A| = n$, then $|P(A)| = {}^nC_0 + {}^nC_1 + \dots {}^nC_n = 2^n$

Possibilities → ① 0/1 0/1 (x_1 x_2)

→	0	0
→	0	1
→	1	0
→	1	1

$4 = 2^2 = 2^n$ (n = no. of element) possibility

② 0/1/2 0/1/2 (x_1 x_2)

3 possibility of two elements $= 3^2$

③ 0/1 0/1 0/1 (x_1 x_2 x_3) $8 = 2^3$