

Unit-2

Propositional logic

If proposition
true or false

- Definition of proposition (determine whether it is proposition or not)
- Truth tables of proposition logical connectives
- Laws of propositional logic

- Inverse,

Converse,

Contrapositive

- Equivalence of proposition with different truth tables in cases.

like $p \rightarrow q \equiv \neg p \vee q$ true or false- Duality
finding

- Tautology, contradiction, contingency with cases & truth table
- Conversion of English sentences to symbolic form

Theory of Inference

- Rules of Inference (known) with examples
- Valid & Invalid argument with & without truth table

Predicates & quantifiers

- Limitation of propositional logic
- Conversion of English like statement to symbolic form

(Predicates & quantifiers)

- Define predicates & quantifiers
- Negation of quantifiers
- Rules of Inference for predicate calculus

Free & Bound
variablesUniversal generalization
SpecificationExistential generalization
Specification

- Validity & Invalid argument
- Indirect Method in theory of Inference for predicate calculus

- Normal forms (Removal of conditional & Biconditional connectives)
- CNF & DNF
- PCNF & PDNF (with & without truth table)
- PCNF then PDNF from it and vice versa
- Methods of proof

- Direct proof.

- Contrapositive proof

- Contradiction proof

- Inclusion & exclusion principle

- Pigeonhole principle (Generalized & extended pigeonhole, simple pigeonhole)

- Permutation & Combination

- Permutation

- Combination

- Difference between both.

- Pascal & Binomial theorem

- Circular permutation

- Mathematical Induction

- Mathematical Induction

- Complete Induction

- Relation

- Well ordering principle

- Definition

- Representation of Relation

- Domain Range, complement, Inverse

- Composition of relations

- No of Reflexive relations

- Type of all relation - diff also

- Reflexive, Irreflexive, Not Reflexive,

- Symmetric, Asymmetric, Antisymmetric

- Transitive

- diff also

Indegree & Outdegree of graph

Closure of Relation

Reflexive, Symmetric closure, Transitive closure

- Transitive closure using Warshall algo.

Sets

- Definition

- Algebra of sets

- Multiset (definition, operation, cardinality)

Union, difference
Intersection

- Representation of sets

- Type of sets

- Operation on sets (Venn diagram)

- Partitioning of set

- Symmetric difference

- Ordered sets

- De Morgan law (proof using sets).

- Key points in sets (questions) in pdf

- Subset

- Power Set