Paper-I (MCA-301) : Database Systems

UNIT - I

Introduction : Database system applications, database systems versus file systems, views of data, data models, database languages, database users and administrators, transaction management, database system structure, application architecture.

Data modeling using the Entity Relationship Model**:** ER model concepts, notation for ER diagram, mapping constraints, keys, concepts of super key, candidate key, primary key, unique key, generalization, aggregation, reduction of an ER diagram to tables.

UNIT - II

Relational model : Structure of relational databases, relational algebra, tuple relational calculus, domain relational calculus.

SQL : Characteristics of SQL, advantages of SQL, types of SQL commands, SQL operators and their procedure, tables, views and indexes, queries and sub-queries, aggregate functions, insert, update and delete operations, joins, union, intersection, minus, cursors in SQL. domain constraints, referential integrity, assertions, triggers, authorization and authentication.

UNIT - III

Relational database design & normalization : Functional dependencies, normal forms- First, second, third, BCNF, fourth and fifth normal forms, decomposition.

Indexing and Hashing: Basic concepts, ordered indices, B-tree, B+ tree, static hashing, dynamic hashing, comparison of ordered indexing and hashing, index definition in SQL, multiple-key access.

UNIT - IV

Query Processing & Optimization : Measure of query cost, selection operation, sorting, join operation, other operations, evaluation of expressions, estimating statistics of expression results, transformation of relational expression, evaluation plans, materialized views.

Transactions: Transaction concept, atomicity and durability, concurrent execution, serializability – conflict and view, testing of serializability.

UNIT - V

Concurrency Control : Concurrency Control, Locking Techniques for Concurrency control, Time stamping protocols for concurrency control, validation based protocols, multiple granularity, multi-version schemes, deadlock handling, insert and delete operations.

Recovery System : Failure classification, storage structure, recovery and atomicity, log based recovery, shadow paging, recovery with concurrent transactions, buffer management, backup systems.

Recommended Book : Database Systems Concepts - Korth
Fundamental of database system - Elmasiri and Navathe