Paper Code: BCA 110 | **L** | **T** | **C**
Paper ID: 20110 | **3** | **1** | **4**
Paper: Database Management System
Pre-requisites:

- **Basic knowledge of data storage and file management system**

Aim: To introduce the concept of Back end, data storage in computers, design of a DBMS, Queries to construct database, store and retrieve data from the database
Objectives:

- To understand difference between storing data in FMS and DBMS and advantages of DBMS.
- To understand conceptual and physical design of a database.
- To understand RDBMS and queries to design database and manipulate data in it.
- To know basic database backup and recovery.

INSTRUCTIONS TO PAPER SETTERS: **Maximum Marks: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.
3. Only basic level E-R diagram must be asked and complete scenario must be provided.

UNIT-I
Introduction: An overview of database management system, database system Vs file system, Characteristics of database approach, DBMS architecture , data models, schema and instances, data independence.
Data Modeling using Entity Relationship Model: Entity, Entity types, entity set, notation for ER diagram, attributes and keys, Concepts of composite,derived and multivalued attributes, Super Key, candidate key, primary key, relationships, relation types, weak entities, enhanced E-R and object modeling, Sub Classes:, Super classes, inheritance, specialization and generalization.[T1],T2][T3][R1]

[No. of Hrs.: 10]

UNIT – II
Introduction to SQL: Overview , Characteristics of SQL. Advantage of SQL, SQL data types and literals.
Types of SQL commands: DDL, DML, DCL. Basic SQL Queries.
Logical operators :BETWEEN, IN, AND, OR and NOT
Null Values: Disallowing Null Values, Comparisons Using Null Values
Integrity constraints: Primary Key, Not NULL, Unique, Check, Referential key
Introduction to Nested Queries, Correlated Nested Queries, Set-Comparison Operators, Aggregate Operators: The GROUP BY and HAVING Clauses,
Joins: Inner joins, Outer Joins, Left outer, Right outer, full outer joins.
Overview of views and indexes. [T1],[R2] **[No. of Hrs.: 12]**

UNIT – III

Relational Data Model: Relational model terminology domains, Attributes, Tuples, Relations, characteristics of relations, relational constraints domain constraints, key constraints and constraints on null, relational DB schema.Codd's Rules

Relational algebra: Basic operations selection and projection,

Set Theoretic operations Union, Intersection, set difference and division,

Join operations: Inner , Outer ,Left outer, Right outer and full outer join.

ER to relational Mapping: Data base design using ER to relational language.

Data Normalization: Functional dependencies, Armstrong's inference rule, Normal form up to 3rd normal form. [T1],T2][T3][R1] **[No. of Hrs.: 12]**

UNIT – IV

Transaction processing and Concurrency Control: Definition of Transaction, Desirable ACID properties, overview of serializability, serializable and non serializable transactions

Concurrency Control: Definition of concurrency, lost update, dirty read and incorrect summary problems due to concurrency

Concurrency Control Techniques: Overview of Locking,2PL,Timstamp ordering, multiversioning, validation

Elementary concepts of Database security: system failure, Backup and Recovery Techniques, authorization and authentication. [T1],T2][T3]

[No. of Hrs.: 10]

TEXT BOOKS:

[T1] R. Elmarsi and SB Navathe, "Fundamentals of Database Systems", Pearson,5th Ed.

[T2] Singh S.K., "Database System Concepts, design and application", Pearson Education

[T3] Ramakrishnan and Gherke, "Database Management Systems", TMH.

REFERENCE BOOKS:

[R1]Abraham Silberschatz, Henry Korth, S. Sudarshan, "Database Systems Concepts", 4th Edition, McGraw Hill, 1997.

[R2]Jim Melton, Alan Simon, "Understanding the new SQL: A complete Guide", Morgan Kaufmann Publishers, 1993.

[R3]A. K. Majumdar, P. Battacharya, "Data Base Management Systems', TMH, 1996.

[R4]Bipin Desai, "An Introduction to database Systems", Galgotia Publications, 1991.