UNIT-I

1 a) Draw and explain the detailed system architecture of DBMS. [8M]
  b) What are the advantages of DBMS? [4M]
  c) Describe the concept of client/server model. [4M]
2 a) Discuss the main characteristics of the database approach and specify how
     it differs from traditional file system. [8M]
  b) Explain in detail about the three tier schema architecture of DBMS. [8M]
3 a) Discuss the activities of different database users. [8M]
  b) Briefly describe various architectures of database systems. [8M]
4 a) Compare the database system with conventional file system. [8M]
  b) Describe in detail about two-tier and three-tier client-server architectures. [8M]
5 a) Explain the role of a data base administrator. [6M]
  b) What are the different data models present and explain briefly? [6M]
  c) Explain the merits and demerits of data base system. [4M]

UNIT-II

1 a) Explain in detail about various key constraints used in database system. [10M]
  b) Explain the importance of Null values in Relational Model. [6M]
2 a) Describe the concept of Referential Integrity. [8M]

  b) List and explain the common data types available in SQL. [8M]
3 a) Write a short notes on i) Foreign Key ii) Relation state iii) Database schema. [12M]
  b) Write and explain the structure of SQL SELECT statement with suitable example.
                                                                                    [4M]
4 a) Explain the importance of avoiding NULL values in a database. [4M]
  b) Write short notes on i) DDL ii) DML iii) Database Schema.[12M]
5 a) What is a relation? Describe the characteristics of a relation. [6M]
  b) Discuss the importance of entity integrity and referential integrity constraints. [5M]
  c) What is relation schema and state?[5M]

UNIT-III

1 a) Discuss the mechanism of attribute relationship inheritance. How is it useful? [8M]
  b) By considering an example describe various data update operations in SQL.[8M]
2 a) Differentiate specialization and generalization. [8M]
  b) What is a view? How views are implemented? [8M]
3 a) Discuss in detail about the concepts of E-R model with suitable examples. [8M]
  b) What is a group function? List and explain how to use group functions in SQL
      with appropriate examples.[8M]
4 a) Explain about various constraints used in ER-model. [8M]
  b) Differentiate between independent and correlated nested queries.[8M]
5 a) Consider the following schemas:
        Sailors (sid, sname, rating, age)
        Reserves (sid, bid, day)
        Boats (bid, bname, color)
   Write the following queries in relational algebra, tuple relational Calculus and
      domain relational calculus:
        a) Find the name of sailors who have reserved boat 103.
        b) Find the names and ages of sailors with a rating above 7.
        c) Find the names of sailors who have reserved a red boat.
        d) Find the sname, bid, and day for each reservation.
        e) Find the name of sailors who have reserved at least one boat. [10M]
  b) Draw an ER diagram for Hospital management system. [6M]

UNIT-IV

1 a) Explain insertion, deletion and modification anomalies with suitable examples.[8M]
   b) State BCNF. How does it differ from 3NF?[8M]
2 a) What is meant by the closure of functional dependencies? Illustrate with an example.[7M]
   b) State 1NF, 2NF & 3NF and explain with examples. [9M]
3 a) State the Armstrong inference rules. Provide suitable examples to describe each.[8M]
   b) Show how to preserve Functional Dependencies during decomposition.[8M]
4 a) What is normalization? Explain its need. [4M]
   b) Discuss in detail about various normal forms.[12M]
5 a) What is multi valued dependency? Illustrate 4NF with an example [8M]
   b) What is Functional Dependency? Explain types and properties of FD's.[8M]

UNIT-V

1 a) Draw transaction state diagram and describe each state that a transaction goes through during its execution.[8M]
   b) Explain in detail about timestamp based concurrency control techniques.[8M]
2 a) Discuss about different types of failures. [8M]
   b) What is 2-phase locking protocol? How does it guarantee serializability? [8M]
3 a) Why the concurrency control is needed? Explain it. [8M]
   b) Write and explain optimistic concurrency control algorithm.[8M]
4 a) Write short notes on:
       i) Phantom Record ii) Repeatable Read iii) Incorrect Summary iv) Dirty Read.[8M]
   b) Describe Wait/Die and Wound/Wait deadlock protocols.[8M]
5 a) What is transaction? Mention the desirable properties of a transaction. [6M]
   b) Discuss about transaction recovery techniques.[10M]

UNIT-VI

1 a) Explain in detail about internal hashing Techniques. [8M]
   b) Discuss in detail about cluster and Multilevel indexes. [8M]
2 a) Explain in detail about external hashing techniques. [8M]
   b) By considering an example, show how to reduce access time with primary index.[8M]
3 a) When does a collision occur in hashing? Illustrate various collision resolution techniques.[8M]
   b) Describe different methods of defining indexes on multiple keys. [8M]
4 a) Discuss in detail about primary file organization. [8M]
   b) By considering relevant example,show insertion and deletion operations on a B-tree.[8M]
5 a) Distinguish between:
       i) Primary and Secondary indexing. ii) Ordered indexing and hashing.[8M]
   b) Explain in detail about B+ trees. [8M]

Signature of the faculty   Signature of the HOD