UNIT I

1) Identify various components in client/server architecture for DBMS.
2) Demonstrate various DDL commands with relevant examples.
3) Demonstrate DML commands with relevant examples.
4) Explain three tier schema architecture in DBMS.
5) What is a database? What are its storage mechanisms?
6) Discuss the characteristics of Database approach?
7) Compare and contrast the storage of data in files and databases.
8) Explain in detail about data models?
9) Write a short notes on Instance and schema?
10) Write any three database applications with their functionalities.
11) Discuss the classification of DBMS?
12) Define data independence? How do you implement data independence in DBMS? Explain
13) Justify how constraint specification is helpful for the database design?
14) Demonstrate data abstraction implementation in DBMS.
15) Explain the architecture of DBMS with a neat sketch.

UNIT II

1) Explain Relational Model with a suitable example?
2) Demonstrate generalization and aggregation by using E-R diagram
3) Define Super key, Candidate key, Primary key and foreign key with suitable examples.
4) Interpret domain constraints and key constraints?
5) Construct an E-R diagram for a hospital with a set of patients and a set of medical doctors. Associate with each patient a log of the various tests and examinations conducted.
6) Construct an E-R diagram for a hospital with a set of patients and a set of medical doctors. Associate with each patient a log of the various tests and examinations conducted.
7) Write the additional features of E/R Model.
8) Write a short note on following with suitable examples?
   a) Entity
   b) Attribute
   c) Relationship
   d) Entity Set
9) Analyse Entity versus attribute and Entity versus Relationship?
10) Discuss the representation of total participation and multivalued attribute in an E/R diagram.
11) Consider the Bank Management System. account(account_number, branch_name, balance) branch (branch_name, branch_city, assets) customer (customer_name customer_street, customer_city) loan (loan_number, branch_name, amount) depositor((customer_name, account_number) borrower(customer_name, loan_number) Based on the above schema, write the corresponding SQL queries for the following? i) For all customers who have a loan from the bank, find their names,

loan numbers, and loan amount. ii) Find the customer names, loan numbers, and loan amounts, for all loans at the Perryridge branch. iii) Find the names of all branches that have assets greater than those of at least one branch located in Brooklyn. iv) Find the average account balance of those branches where the account balance is greater than Rs. 1200. v) Find the maximum across all branches of the total balance at each branch.

12) Write the additional features of E/R Model.
13) How would you use the operators IN, EXISTS, UNIQUE, ANY and ALL in writing nested queries? Why are they useful? Explain with an example.
14) Explain nested queries and correlated queries with examples.
15) Consider the SAILOR DATABASE Sailors (sid:string, sname:string, rating:integer, age:real) Boats (bid:integer, bname:string, color:string) Reserves (sid:integer, bid:integer, day:date) Based on the above schema, write the corresponding SQL queries for the following?
    i) Find the colors of boats reserved by Lubber.
    ii) Find the names of sailors who have reserved at least one boat.
    iii) Find the names of sailors who have reserved a red or green boat.
    iv) Find the names of the sailors who have reserved both a Red boat and a Green boat.
    v) Find names of sailors who have reserved all boats.

UNIT III

1) Explain various join operations in relational algebra?
2) Explain various types of Joins available in SQL with examples
3) List out any four operations on relational algebra. Explain.
4) Elaborate the properties of decomposition?
5) Illustrate 3NF with a suitable example?
6) Explain BCNF with a suitable example?
7) Write short notes on Normalization and explain why it is needed?
8) State the problem caused due to redundancy?
9) Elaborate the specification of functional dependencies on relations?

UNIT IV

1) Discuss about ACID properties?
2) What is time stamp ordering? Explain how it is used for concurrency control?
3) Write a short note on Lock based concurrency control?
4) Discuss the issues in handling concurrent transactions.
5) Explain how Concurrency control can be achieved with locking methods.
6) Detail the features of lock management and lock conversions?
7) How would you use the operators IN, EXISTS, UNIQUE, ANY and ALL in writing nested queries? Why are they useful? Explain with an example.
8) What is 2-phase locking protocol? Compare 2PL with Strict 2PL protocol?
9) Discuss about serializability.
10) Justify serializability and recoverability is necessary to support concurrency control?
11) Discuss ARIES Algorithm.
12) Consider the following schedule of three transactions

T1: r1(X), w1(X); T2: w2(X); and T3: w3(X)
Schedule S: r1(X); w2(X); w1(X); w3(X);
Check whether the Schedule S is view equivalent to any serial schedule or not? Give Justification to your answer with neat explanation.

UNIT V

1) Discuss about various File Organization Techniques.
2) Elaborate hash based indexing and tree based indexing.
3) Compare Primary Index with Secondary Index.
4) What are the differences among primary, secondary and clustering indexes? How do these differences affect the ways in which these indexes are implemented? Which of the indexes are dense and which are not?
5) Demonstrate the implementation of B trees.
6) What are the benefits of using dynamic indexing? Explain in detail B+ tree file organization.
7) Explain ISAM with an example.
8) Compare and contrast the data storage on external versus data storage on internal?