Course Code: 23CS0512 **R23**

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

Siddarth Nagar, Narayanavanam Road –517583

QUESTION BANK

Course & Branch: B.Tech – CIA

Year & Sem: III-B.Tech & I-Sem

Subject with Code: Database Management Systems (23CS0512) **Regulation:** R23

UNIT – I
INTRODUCTION & ENTITY RELATIONSHIP MODEL

1	**a)**	List two differences between a file system and a database system.	**[L1][CO1]**	**[2M]**
	b)	State the purpose of data abstraction.	**[L1][CO1]**	**[2M]**
	c)	Name any one entity used in a database.	**[L1][CO1]**	**[2M]**
	d)	Describe composite attributes with a suitable example.	**[L1][CO1]**	**[2M]**
	e)	How does a superclass differ from a subclass in an ER diagram?	**[L2][CO1]**	**[2M]**
2	**a)**	Define Database. Discuss about applications of Database Systems.	**[L1][CO1]**	**[5M]**
	b)	Identify the purpose of Database Systems.	**[L3][CO1]**	**[5M]**
3	**a)**	Outline the Data Abstraction and discuss levels of Abstraction.	**[L2][CO1]**	**[5M]**
	b)	Differentiate between Database users and administrators.	**[L4][CO1]**	**[5M]**
4	**a)**	Discuss about various data models.	**[L2][CO1]**	**[5M]**
	b)	Explain the following terms: I. Schema II. Instance III. Data independence	**[L2][CO1]**	**[5M]**
5	**a)**	Design a Three tier schema Architecture of Database with a neat diagram.	**[L3][CO1]**	**[5M]**
	b)	Illustrate about Database system structure.	**[L3][CO1]**	**[5M]**
6	**a)**	Define Environment in DBMS. Explain its components.	**[L1][CO1]**	**[5M]**
	b)	Construct a Centralized and Client Server architecture for the database	**[L6][CO1]**	**[5M]**
7	**a)**	Explain the Entity-Relationship (ER) Model in detail..	**[L2][CO1]**	**[5M]**
	b)	Define and explain Entity and Entity Set in DBMS with examples.	**[L1][CO1]**	**[5M]**
8	**a)**	What are attributes in the ER Model? Illustrate different types with examples.	**[L1][CO1]**	**[5M]**
	b)	Distinguish between Relationship and Relationship set.	**[L5][CO1]**	**[5M]**
9	**a)**	What are Superclass and Subclass in DBMS? Illustrate with an ER diagram.	**[L1][CO1]**	**[5M]**
	b)	Illustrate the Inheritance in the ER Model with an example.	**[L3][CO1]**	**[5M]**
10	**a)**	Define and explain Specialization in ER Model with examples.	**[L1][CO1]**	**[5M]**
	b)	Define Generalization in ER Model. How is it different from Specialization?	**[L1][CO1]**	**[5M]**
11		Construct ER Diagram for any two with neat explanation(i.e. Banking system, Hospital management system, Railway Reservation system, Online Shopping)	**[L6][CO1]**	**[10M]**

Course Code: 23CS0512 **R23**

UNIT – II
RELATIONAL MODEL AND BASIC SQL

1	**a)**	Differentiate between primary key and candidate key.	**[L4][CO2]**	**[2M]**
	b)	Define super key with an example.	**[L1][CO2]**	**[2M]**
	c)	What is the importance of null values in a database?	**[L1][CO2]**	**[2M]**
	d)	State the purpose of the WHERE clause in SQL.	**[L1][CO2]**	**[2M]**
	e)	Distinguish between CHAR and VARCHAR data types.	**[L2][CO2]**	**[2M]**
2	**a)**	Discuss the significance of domain, attribute, tuple, and relation with examples.	**[L2][CO2]**	**[5M]**
	b)	What are null values in the relational model? Explain their importance with examples.	**[L1][CO2]**	**[5M]**
3		Classify various types of constraints in the relational model with suitable examples.	**[L3][CO2]**	**[10M]**
4	**a)**	Identify relational database query language.	**[L3][CO2]**	**[5M]**
	b)	Illustrate different operations in Relational algebra with an example.	**[L3][CO2]**	**[5M]**
5	**a)**	Compare the Selection and Projection in key constraints.	**[L5][CO2]**	**[5M]**
	b)	Develop the working on union, intersection and set differences operations.	**[L6][CO2]**	**[5M]**
6	**a)**	Compare and contrast Relational Algebra and Relational Calculus.	**[L5][CO2]**	**[5M]**
	b)	Discuss about the operators renaming, division with examples.	**[L2][CO2]**	**[5M]**
7		What is Relational Calculus? Differentiate between Tuple Relational Calculus and Domain Relational Calculus with examples.	**[L4][CO2]**	**[10M]**
8	**a)**	List and identify a common data types used in SQL with examples.	**[L1][CO2]**	**[5M]**
	b)	Design a table Employee using appropriate SQL data types(like INT,VARCHAR and DATE)	**[L6][CO2]**	**[5M]**
9		Design a table student using appropriate SQL data types(like INT, FLOAT, CHAR,VARCHAR , BOOLEAN and DATE)	**[L6][CO2]**	**[10M]**
10		Classify Database languages with examples.	**[L4][CO2]**	**[10M]**
11	**a)**	Create the DDL Commands – Table Creation, Altering the table structures, truncating a table and dropping a table.	**[L6][CO2]**	**[5M]**
	b)	Develop the DML Commands – Insert, Select Commands, update& delete Commands.	**[L6][CO2]**	**[5M]**

UNIT-III
BASIC SQL QUERYING, SQL FUNCTIONS, AGGREGATION,JOINS AND ADVANCED AGGREGATION FUNCTIONS

1	**a)**	State the purpose of the SELECT statement in SQL.	**[L1][CO3]**	**[2M]**
	b)	Compare the `AND` and `OR` logical operators in SQL.	**[L4][CO3]**	**[2M]**
	c)	Name any two SQL functions used to work with date and time.	**[L1][CO3]**	**[2M]**
	d)	Explain the purpose of the CHECK constraint with an example.	**[L2][CO3]**	**[2M]**
	e)	Define a view in SQL.	**[L1][CO3]**	**[2M]**
2	**a)**	Illustrate about Basic SQL Querying (SELECT & WHERE) with examples.	**[L3][CO3]**	**[6M]**
	b)	Develop a query to display the names and salaries of employees earning more than 50,000.	**[L6][CO3]**	**[4M]**
3	**a)**	What are the different types of operators explain with examples.	**[L2][CO3]**	**[5M]**
	b)	Given a table STUDENTS(student_id, name, age, department, marks), develop SQL queries to: i) Display the names and departments of all students. ii) Display the details of students with marks greater than 75. iii) Display students from the 'Computer Science' department.	**[L6][CO3]**	**[5M]**
4	**a)**	Compare an Arithmetic and Logical Operations with examples.	**[L5][CO3]**	**[5M]**
	b)	Using a table EMPLOYEES(emp_id, name, salary, department_id), develop SQL queries to: i) Increase each employee's salary by 15% and display the new salary. ii) Display employees who earn more than 5000 and belong to department 20. iii) Display employees whose salary is not equal to 6000 and department is not 30.	**[L6][CO3]**	**[5M]**
5	**a)**	List and Identify the SQL Functions like (Date, Numeric, String) with examples.	**[L3][CO3]**	**[5M]**
	b)	Given a table ORDERS(order_id, customer_name, order_date, amount), develop queries to: i) Extract the year and month from the order date. ii) Display amount rounded off to the nearest 100. iii) Display customer names in UPPERCASE and lowercase formats.	**[L6][CO3]**	**[5M]**
6		Discuss the super key, candidate key, primary key, alternate key, composite key , and Foreign key.	**[L2][CO4]**	**[10M]**
7	**a)**	Discuss about Complex integrity constraints in SQL.	**[L2][CO4]**	**[5M]**
	b)	Create a sub query to establish the WHERE, ANY,AS and ALL sub queries with example.	**[L6][CO4]**	**[5M]**
8	**a)**	Differentiate between Nested Queries & Sub queries with examples.	**[L4][CO4]**	**[5M]**
	b)	Evaluate Order by, Group by and Having Clauses with example.	**[L4][CO4]**	**[5M]**
9		Distinguish different types of aggregate operators with examples in SQL.	**[L4][CO4]**	**[10M]**
10	**a)**	Classify different join operations and explain with example SQL Joins (INNER, LEFT, RIGHT, FULL)	**[L4][CO4]**	**[5M]**
	b)	Illustrate about different Views like (Updatable and Non-updatable) with examples.	**[L3][CO4]**	**[5M]**
11	**a)**	Explain about Relational Set Operations with examples	**[L2][CO4]**	**[5M]**
	b)	Given two tables OLD_CUSTOMERS(customer_id) and NEW_CUSTOMERS(customer_id) develop queries to: i) Display customer IDs present in both tables (INTERSECT). ii) Display customers present in OLD_CUSTOMERS but not in iii) Display all unique customer IDs from both tables (UNION).	**[L2][CO4]**	**[5M]**

UNIT-IV
SCHEMA REFINEMENT (NORMALIZATION)

1	**a)**	Give an example of a functional dependency.	**[L2][CO5]**	**[2M]**
	b)	State the main purpose of normalization in database design.	**[L1][CO5]**	**[2M]**
	c)	Why do we convert tables to 1NF?	**[L3][CO5]**	**[2M]**
	d)	Define transitive dependency.	**[L1][CO5]**	**[2M]**
	e)	What is lossless join decomposition?	**[L1][CO5]**	**[2M]**
2	**a)**	Explain about purpose of Normalization or schema refinement.	**[L2][CO5]**	**[5M]**
	b)	Illustrate about Functional Dependency.	**[L3][CO5]**	**[5M]**
3	**a)**	Explain the following with suitable example. (i) Full functional dependency. (ii) Partial dependency.	**[L2][CO5]**	**[5M]**
4	**b)**	Compare Trivial and Non – Trivial Functional Dependencies with example.	**[L4][CO5]**	**[5M]**
5		Outline the terminologies: Partial Dependency,Transitive Dependency, Determinant, MVD, Join Dependency.	**[L2][CO5]**	**[10M]**
6	**a)**	Consider the schema: R (A, B, C, G, H, I) and the set of FD‟s (A → B, A → C, CG → H, CG → I, B → H). Prove the members of F^+: A → H, CG → HI, AG → I with axioms is true.	**[L5][CO5]**	**[5M]**
	b)	Consider the relation scheme R = {E, F, G, H, I, J, K, L, M, M} and the set of functional dependencies {{E, F} -> {G}, {F} -> {I, J}, {E, H} -> {K, L}, K -> {M}, L -> {N} on R. What is the key for R?	**[L5][CO5]**	**[5M]**
7	**a)**	Discuss about preserving Decomposition.	**[L2][CO5]**	**[5M]**
	b)	Define Decomposition. Identify the properties of decomposition.	**[L1][CO5]**	**[5M]**
8	**a)**	Illustrate the types of anomalies with example.	**[L3][CO5]**	**[5M]**
	b)	What is Normalization? Describe the importance of normalization.	**[L2][CO5]**	**[5M]**
9		Explain in detail about 1NF, 2NF,3NF and BCNF with example.	**[L2][CO5]**	**[10M]**
10	**a)**	What is the use of Fourth normal form? Explain by listing some of its major advantages.	**[L1][CO5]**	**[5M]**
	b)	Differentiate between about 4NF/MVD with example.	**[L4][CO5]**	**[5M]**
11	**a)**	What is the use of Fifth normal form? Explain by listing some of its major advantages.	**[L1][CO5]**	**[5M]**
	b)	Discover about 5NF/PJNF with example.	**[L2][CO5]**	**[5M]**

UNIT-V
TRANSACTION CONCEPT & INTRODUCTION TO INDEXING TECHNIQUES

1	**a)**	List the different states of a transaction.	**[L1][CO6]**	**[2M]**
	b)	Name two types of serializability.	**[L1][CO6]**	**[2M]**
	c)	Define the Two-Phase Locking (2PL) protocol.	**[L1][CO6]**	**[2M]**
	d)	State the purpose of a recovery algorithm.	**[L1][CO6]**	**[2M]**
	e)	Give an example of hash-based indexing.	**[L2][CO6]**	**[2M]**
2	**a)**	Define a Transaction. Illustrate the properties of transaction.	**[L1][CO6]**	**[5M]**
	b)	How do you implement Atomicity and Durability?	**[L2][CO6]**	**[5M]**
3		Explain the ACID properties of a transaction with suitable examples.	**[L2][CO6]**	**[10M]**
4	**a)**	Describe the different states of a transaction with a state diagram.	**[L2][CO6]**	**[5M]**
	b)	Illustrate Concurrent execution of transaction with examples	**[L3][CO6]**	**[5M]**
5		Develop the TCL and DCL Commands – Commit, Rollback , Savepoint,Grant and Revoke.	**[L6][CO6]**	**[10M]**
6		What is serializability? Explain conflict serializability and view serializability with examples.	**[L2][CO6]**	**[10M]**
7	**a)**	Compare and contrast lock-based, timestamp-based, and optimistic concurrency control protocols.	**[L5][CO6]**	**[5M]**
	b)	Compare serializibility and non-serializibility	**[L5][CO6]**	**[5M]**
8	**a)**	Express the concept of testing for serializability in database transactions.	**[L2][CO6]**	**[5M]**
	b)	What is a deadlock? Explain deadlock detection, prevention, and recovery in DBMS.	**[L2][CO6]**	**[5M]**
9	**a)**	Explain recoverability in transaction schedules. Differentiate between Recoverable, cascade less, and strict schedules.	**[L4][CO6]**	**[5M]**
	b)	Describe the different types of failures in database systems.	**[L2][CO6]**	**[5M]**
10	**a)**	Discuss the implementation of isolation in database transactions.	**[L2][CO6]**	**[5M]**
	b)	Compare B+ Tree indexing and hash-based indexing. What are the advantages and disadvantages of each?	**[L5][CO6]**	**[5M]**
11		What is a B+ Tree? Explain its structure and operations (search, insert, delete) With diagrams.	**[L2][CO6]**	**[10M]**