CMR TECHNICAL CAMPUS
UGC AUTONOMOUS
B. Tech. IV Semester Regular &Supply End Examinations, July/August-2023
Data Base Management Systems
Common to CSE, IT, CSM, CSD, AIML&CSG

Time: 3 Hours   Max. Marks: 70

Note
i. This Question paper contains Part- A and Part- B.
ii. All the Questions in Part A are to be answered compulsorily.
iii. All Questions from Part B are to be answered with internal choice among them.

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PART-A

10 X 02 = 20 Marks

			Marks	CO	BL
1.	a	What is the role of Database Designers?	2	CO1	L1
	b	What do you mean by weak entity set? Give example	2	CO1	L3
	c	How does the "ALTER TABLE" SQL command differ from the "DROP TABLE" command in terms of modifying database tables?	2	CO2	L2
	d	Evaluate the importance of integrity constraints in maintaining data quality.	2	CO2	L5
	e	Provide an example of how to handle NULL values in SQL queries using the "IS NULL" and "IS NOT NULL" operators.	2	CO3	L3
	f	What is Fifth Normal Form (5NF) in the context of database normalization?	2	CO3	L1
	g	Explain the purpose and significance of transaction states in ensuring data consistency and integrity.	2	CO4	L2
	h	What is a timestamp in the context of database management systems (DBMS)?	2	CO4	L1
	i	Analyze the advantages and disadvantages of using cluster indexes compared to non-clustered indexes in different database scenarios.	2	CO5	L4
	j	Explain the purpose and importance of tuning a DBMS for optimizing performance and efficiency.	2	CO5	L2

PART- B

5 X 10 = 50 Marks

			Marks	CO	BL
2.	a	Explain the relationship between data and data models, and how data models represent the structure and organization of data in a database.	5	CO1	L2

	b	What is an ER diagram? Draw an ER diagrams for the entity set. relationship set and a ternary relationship set?	5	CO1	L3
		OR			
3	a	Draw and explain major DBMS functions and components?	5	CO1	L3
	b	What are the standard set operations available in relational algebra? Explain with suitable examples?	5	CO1	L2 L3
4	a	Analyze the importance of integrity constraints in protecting the integrity and reliability of a database. and discuss potential consequences of data violations.	5	CO2	L3
	b	Explain the key objectives and principles of logical database design. such as data normalization. data independence. and data integrity.	5	CO2	L2
		OR			
5	a	Define views in the context of database management systems (DBMS) and explain their purpose in data abstraction and security.	5	CO2	L1
	b	Explain the differences between tuple relational calculus and domain relational calculus, including their syntax and semantics for specifying queries.	5	CO2	L2
6	a	Write queries for the following using the given information:	5	CO3	L5

Emp_Name	DOB	Emp_DOJ	Salary	Bonus	DOR
Buelin	06-12-1983	07-08-2005	15000	600	07-08-2055
Andy	12-01-1970	06-12-1973	20000	1200	06-12-2043
Lubber	07-08-1985	12-04-2006	13000	500	12-04-2056
Zobra	08-02-1960	07-03-1982	25000	1500	07-03-2032

i) Find total salary of employees from emp_table.
ii) Find months between employee DOJ and DOR from emp-schema.
iii) Arrange emp_names in ascending and descending order.

	b	What is the purpose of GROUP BY and HAVING clauses? Explain with suitable examples.	5	CO3	L3
		OR			
7	a	Consider following schemas and write queries for the following:	5	CO3	L5

Sailors (sid: Integer, sname: string, rating: Integer, age: real)
Boats(bid: Integer. bname: string. color: string)
Reserves (sid: Integer, bid: Integer, day: date)
(i) Find the names of sailors who have reserved a yellow boat.
(ii) Find the name of sailors who have reserved at least three boats.
(iii) Find the name of sailors who have reserved all blue boats.

| | b | Consider schema R = (A, B, C, G, H, I) and the set F of functional dependencies {A → B, A → C, CG → H, CG → I, B → H}. Compute the candidate keys of the schema. Compute the closure of the same. | 5 | CO3 | L2 L3 |
| 8 | a | Apply the concepts of atomicity and durability to a real-world database scenario. designing and implementing transaction | 5 | CO4 | L3 |

		management mechanisms to ensure data consistency and durability.			
	b	Explain the Two-Phase Locking protocol and its variants.	5	CO4	L2

OR

9	a	Define the concept of schedule for a set of concurrent transaction. Give a suitable example	5	CO4	L1 L2
	b	Define validation-based protocols in the context of concurrency control in database management systems (DBMS) and explain their role in ensuring data consistency and correctness during concurrent transactions.	5	CO4	L1 L2

10	a	Define data on external storage and explain its significance in managing large and complex databases.	4	CO5	L1
	b	Explain the following: i) Cluster indexes; ii) Primary and secondary indexes iii) Clustering file organization.	6	CO5	L2

OR

11	a	Analyse the advantages and limitations of using ISAM compared to other data storage methods, such as sequential and direct access files.	4	CO5	L4
	b	Construct a B+—tree for set of key values: (2, 3, 5, 7, 11, 17, 19, 23, 29, 31). Assume that the tree is initially empty and values are added in ascending order. Construct B^+ tree for the cases where the number of pointers that will fit in one node is 4, 6 and 8	6	CO5	L5

CO   : Course Outcomes

BL   : Bloom's Taxonomy Levels   L 1 : Remembering   L 2 : Understanding

L 3 : Applying   L 4 : Analysing

L 5 : Evaluating   L 6 : Creating

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CMR TECHNICAL CAMPUS
UGC AUTONOMOUS
B.Tech - IV Semester, Regular End Examinations, July-2022
DATABASE MANAGEMENT SYSTEMS [20CS401PC]
(Common to CSE, CSD, CSM & IT)

Time: 3 Hours   **Max. Marks: 70**

Answer Any Five Questions
All Questions Carry Equal Marks

5 X 14 = 70 Marks

1. a. Discuss additional features of the ER-Models.   **[7M]**

   b. Define Data Abstraction and discuss levels of Abstraction.   **[7M]**

2. a. Define DBMS. Identify the advantages of using Database Management Systems over traditional File Systems.   **[7M]**

   b. List and explain various Database Applications.   **[7M]**

3. a. Explain the fundamental operations in relational algebra with examples .   **[7M]**

   b. Explain logical database design in detail. What is view? Explain briefly?   **[7M]**

4. Consider the following schema to write queries in Domain relational calculus: **[14M]**

   Sailor(sid, sname, age, rating) Boats(bid, bname, bcolor) Reserves(sid,bid,day)

   a) Find the boats reserved by sailor with id 567.

   b) Find the names of the sailors who reserved 'red' boats.

   c) Find the boats which have at least two reservations by different sailors.

5. a. Define normalization? Explain 1NF, 2NF, 3NF Normal forms.   **[7M]**

   b. Define a nested query, Explain with an example.   **[7M]**

6. Consider a relation R with attribute set {A, B, C, D} and functional dependency set

   $F = \{A \rightarrow B, B \rightarrow C, C \rightarrow D\}$. This relation is decomposed into three sub relations {AB, BC, CD}. Check if the decomposition is dependency preserving or not. Discuss.   **[14M]**

7. a. Discuss about various database recovery approaches?   **[7M]**

   b. Write short note on i. Timestamp based protocol. ii. Validation based protocol.   **[7M]**

8. a. Differentiate clustered and un-clustered Indexes.   **[7M]**

   b. why Tree Structured indexes are good for searching.   **[7M]**

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CMR TECHNICAL CAMPUS
UGC AUTONOMOUS
B. Tech. IV Semester Supply End Examinations, February-2024
Data Base Management Systems
Common to CSE, IT, CSM, CSD, AIML&CSG

Time: 3 Hours   **Max. Marks: 70**

Note
i. This Question paper contains Part- A and Part- B.
ii. All the Questions in Part A are to be answered compulsorily.
iii. All Questions from Part B are to be answered with internal choice among them.

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PART-A

10 X 02 = 20 Marks

			Marks	CO	BL
1.	a	What are the advantages of DBMS?	2	CO1	L1
	b	Discuss the levels of abstraction in a DBMS.	2	CO1	L3
	c	How to identify relationship in an ER diagram?	2	CO2	L2
	d	How do tables and views differ in a DBMS?	2	CO2	L2
	e	Why we need Triggers in a database?	2	CO3	L2
	f	Define Multi valued dependency.	2	CO3	L2
	g	Explain the serializability of transactions.	2	CO4	L4
	h	What are the limitations of timestamp-based protocol for concurrency control?	2	CO4	L4
	i	What is a cluster index in a DBMS, and how does it differ from a non-clustered index?	2	CO5	L2
	j	What is an Indexed Sequential Access Method (ISAM)?	2	CO5	L2

PART- B

5 X 10 = 50 Marks

			Marks	CO	BL
2.	a	Explore the structure of a DBMS, including its main components and their roles.	5	CO1	L6
	b	Explain the process of conceptual database design using Entity-Relationship (ER) modelling.	5	CO1	L4

OR

3	a	Describe the levels of abstraction in a DBMS and their significance in managing complex databases.	4	CO1	L3
	b	Discuss the concept of relationships and relationship sets in the ER model. Explain the different types of relationships, such as one-to-one, one-to-many, and many-to-many, and provide examples to illustrate each type.	6	CO1	L2
4		Discuss the concept of integrity constraints in relational databases. Explain the purpose of integrity constraints and provide examples of different types, such as primary key,	10	CO2	L4

	foreign key, and unique constraints, and how they ensure data integrity. Give Examples.			
	OR			
5	Explain the concepts of tuple relational calculus. Discuss the syntax and semantics of tuple relational calculus, and demonstrate how it can be used to express queries and retrieve data from a relational database. Provide examples to illustrate the usage of tuple relational calculus.	10	CO2	L4
6 a	Discuss the concepts of UNION, INTERSECT, and EXCEPT operators in relational algebra. Explain the purpose and functionality of each operator, and provide examples.	5	CO3	L4
b	Design a lossless join decomposition for a given relational database schema. Explain the concept of lossless join decomposition and its significance in preserving data integrity.	5	CO3	L5
	OR			
7 a	Evaluate different types of complex constraints, such as check constraints, unique constraints, and referential integrity constraints. Provide examples.	5	CO3	L5
b	Explain the concept of multi-valued dependencies (MVDs) and their importance in database normalization beyond third normal form.	5	CO3	L3
8 a	Explain the different states of a transaction in the context of a database system. Discuss the active, partially committed, committed, aborted, and failed states of a transaction.	5	CO4	L4
b	Discuss the challenges and techniques involved in recovery with concurrent transactions. Explain the concept of concurrency control and its impact on recovery mechanisms.	5	CO4	L3
	OR			
9 a	Explain the definition of serializability and its importance in maintaining data consistency. Analyse the criteria for determining if a schedule is serializable, such as conflict serializability and view serializability.	5	CO4	L4
b	How does the ACID (Atomicity, Consistency, Isolation, Durability) principle relate to recovery and atomicity in a DBMS? Explain how the recovery mechanisms ensure the atomicity of transactions and maintain database durability.	5	CO4	L2
10 a	How records are represented and organized in a file? Explain with suitable example.	5	CO5	L2
b	What are the key principles behind Indexed Sequential Access Methods (ISAM) in a DBMS.	5	CO5	L1
	OR			
11 a	What is tree-based indexing in a DBMS, and how does it differ from hash-based indexing? Discuss the benefits and trade-offs of tree-based indexing.	5	CO5	L2
b	What is a B+Tree? Describe the properties of B+trees. Explain the structure of internal and external nodes in B+tree.	5	CO5	L1

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