# CMR TECHNICAL CAMPUS
## UGC AUTONOMOUS
### B. Tech. IV Semester Supply End Examinations, July/August-2023
### Database Management Systems
### Common to CSE & IT

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 keys? Discuss its importance in DBMS. | 2M | CO1 | L1 |
| | b | What is a strong entity? | 2M | CO1 | L1 |
| | c | Explain Relationship and relationship sets. | 2M | CO2 | L2 |
| | d | What is the difference between logical data independence and physical data independence? | 2M | CO2 | L4 |
| | e | What is the difference between second normal form and third normal form. | 2M | CO3 | L4 |
| | f | What is a functional dependency? | 2M | CO3 | L1 |
| | g | Define ACID property. | 2M | CO4 | L1 |
| | h | Discuss the necessary conditions for a deadlock to occur. | 2M | CO4 | L6 |
| | i | Define single level and multilevel indexing | 2M | CO5 | L1 |
| | j | Define serializability. | 2M | CO5 | L1 |

## PART- B

5 X 10 = 50 Marks

| | | | Marks | CO | BL |
|---|---|---|---|---|---|
| 2. | a | What is Data Model? Explain its types? | 5M | CO1 | L2 |
| | b | Propose an ER Model for Hospital Management System. | 5M | CO1 | L6 |

OR

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|---|---|---|---|---|---|
| 3 | a | Write a note on Integrity Constraints | 5M | CO1 | L1 |
| | b | Discuss various data manipulation functions and aggregate functions in SQL. | 5M | CO1 | L6 |
| 4 | a | What is the difference between tuple relational calculus and domain relational calculus? | 5M | CO2 | L4 |
| | b | What is meant by referential integrity? Explain. | 5M | CO2 | L2 |

OR

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|---|---|---|---|---|---|
| 5 | a | What is an integrity constraint? Explain its enforcement by DBMS with illustrative example | 5M | CO2 | L2 |
| | b | What is a view? Explain its purpose. Identify an application area for updatable views? | 5M | CO2 | L3 |
| 6 | a | What is a trigger? How to create it? Discuss various types of triggers. | 5M | CO3 | L6 |
| | b | What is functional dependency? Explain its use in database design. | 5M | CO3 | L2 |

OR

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|---|---|---|---|---|---|
| 7 | a | Discuss the problems caused by redundancy and justify how normalization tackles this problem | 5M | CO3 | L5 |
| | b | Propose relation schemas for the following normal forms i) 2NF but not in 3NF ii) 3NF but not in BCNF | 5M | CO3 | L6 |
| 8 | a | What do you mean by deadlock? How it can be removed? | 5M | CO4 | L1 |
| | b | Discuss about conflict Serializability with an example. | 5M | CO4 | L6 |

OR

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|---|---|---|---|---|---|
| 9 | a | Define transaction and explain desirable properties of transactions. | 5M | CO4 | L1 |
| | b | What is database Recovery? Explain Shadow paging in detail. | 5M | CO4 | L2 |
| 10 | a | What are the primary and Secondary indexes Explain? | 5M | CO5 | L6 |
| | b | Which file operations are preferred on hash file and why? | 5M | CO5 | L1 |

OR

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|---|---|---|---|---|---|
| 11 | a | Compare dynamic hashing with static hashing | 5M | CO5 | L4 |
| | b | Explain about indexed sequential files with advantages and disadvantages. | 5M | 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

# 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 |

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|---|---|---|---|---|---|
| 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 |

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| 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.

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|---|---|---|---|---|---|
| | b | What is the purpose of GROUP BY and HAVING clauses? Explain with suitable examples. | 5 | CO3 | L3 |

OR

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|---|---|---|---|---|---|
| 7 | a | Consider following schemas and write queries for the following:<br>**Sailors** (sid: Integer, sname: string, rating: Integer, age: real)<br>**Boats**(bid: Integer, bname: string, color: string)<br>**Reserves** (sid: Integer, bid: Integer, day: date)<br>(i) Find the names of sailors who have reserved a yellow boat.<br>(ii) Find the name of sailors who have reserved at least three boats.<br>(iii) Find the name of sailors who have reserved all blue boats. | 5 | CO3 | L5 |
| | 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 |

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| 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.

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|---|---|---|---|---|---|
| | b | Explain the Two-Phase Locking protocol and its variants. | 5 | CO4 | L2 |

OR

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|---|---|---|---|---|---|
| 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 |

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

OR

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|---|---|---|---|---|---|
| 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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