**SRINIVASA RAMANUJAN INSTITUTE OF TECHNOLOGY**

**(AUTONOMOUS)**

II B. Tech I Sem – Question Bank

**DATABASE MANAGEMENT SYSTEMS**

**[194GA05301]**

**(Computer Science and Engineering)**

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| **CO** | **COURSE OUTCOMES** | **BL** |
| CO1 | Demonstrate the fundamentals of database management systems. | Understand |
| CO2 | Design and Refine a database using ER Model, Relational Model and normalization. | Apply |
| CO3 | Illustrate a transaction model with various concurrency control Protocols and Recovery Mechanisms. | Understand |
| CO4 | Construct SQL Queries, Functions, stored procedures, and triggers for a Relational Databases. | Apply |
| CO5 | Solve access time for a media with various File Organization. | Apply |
| CO6 | Make use of Operations of B+ Tree Indexing and Hashing indexing | Apply |

**\**Note:*** *1.Remeber(****R****), 2.Understand (****U****), 3. Apply (****A****) 4. Analyze (****An****), 5. Evaluate (****E****), 6. Create(****C****)*

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| **UNIT – 1 (2 Marks)** | | | |
| **#** | **Questions** | **CO** | **BL** |
| 1 | **Define Database.** | CO1 | Remember |
| 2 | **Define DBMS.** | CO1 | Remember |
| 3 | **What are the applications of Database Systems?** | CO1 | Remember |
| 4 | **What is a Data Model?** | CO1 | Remember |
| 5 | **Classify Data Models** | CO1 | Remember |
| 6 | **Define DBA.** | CO1 | Remember |
| 7 | **What are Database languages?** | CO1 | Remember |
| 8 | **Define Data Abstraction.** | CO1 | Remember |
| 9 | **Draw three-tier database Architecture.** | CO1 | Remember |
| 10 | **Define Data Dictionary.** | CO1 | Remember |

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| **UNIT – 1 (5/10 Marks)** | | | | |
| **#** | **Questions** | **M** | **CO** | **BL** |
| 1 | **Draw and Explain Database Architecture.** | 10 | CO1 | Understand |
| 2 | **Explain overall structure of Database Management Systems.** | 10 | CO1 | Understand |
| 3 | **Describe the components of Storage Manager and Query Processor.** | 10 | CO1 | Understand |
| 4 | **Explain the advantages of using a DBMS over File Processing System.** | 10 | CO1 | Understand |
| 5 | **Describe the Functions of a DBA.** | 10 | CO1 | Understand |
| 6 | **What are the applications of Database Systems explain?** | 5 | CO1 | Understand |
| 7 | **Describe the role of Database users.** | 5 | CO1 | Understand |
| 8 | **Explain the advantages and disadvantages of DBMS.** | 10 | CO1 | Understand |
| 9 | **Explain Data Abstraction with suitable examples.** | 10 | CO1 | Understand |
| 10 | **Illustrate Database Languages in detail.** | 10 | CO1 | Understand |

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| **UNIT – 2 (2 Marks)** | | | |
| **#** | **Questions** | **CO** | **BL** |
| 1 | **What is foreign key? Give example.** | CO2 | Remember |
| 2 | **Define Domain Relational Calculus. Give the General Form.** | CO2 | Remember |
| 3 | **What is Relational Algebra?** | CO2 | Remember |
| 4 | **Classify Aggregate Functions in SQL.** | CO2 | Remember |
| 5 | **Define Primary key and Candidate key.** | CO2 | Remember |
| 6 | **Define Tuple Relational Calculus.** | CO2 | Remember |
| 7 | **Define Trigger.** | CO2 | Remember |
| 8 | **Define Natural Join.** | CO2 | Remember |
| 9 | **Define Schema and Instance.** | CO2 | Remember |
| 10 | **What is union compatibility?** | CO2 | Remember |

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| **UNIT – 2 (5/10 Marks)** | | | | |
| **#** | **Questions** | **M** | **CO** | **BL** |
| 1 | **Illustrate set and set Comparison operators in SQL with example.** | 10 | CO4 | Apply |
| 2 | **Illustrate nested queries and null values in detail with examples.** | 10 | CO2 | Apply |
| 3 | **Illustrate all the relational algebra operations with examples.** | 10 | CO2 | Apply |
| 4 | **What are aggregate functions? List the aggregate functions supported by SQL.** | 10 | CO4 | Apply |
| 5 | **Explain data manipulation commands in SQL with syntax and examples.** | 10 | CO4 | Apply |
| 6 | **Explain data definition commands in SQL with syntax and examples.** | 10 | CO4 | Apply |
| 7 | **What is a view in SQL? How it is defined? Explain with an example.** | 10 | CO4 | Apply |
| 8 | **Explain tuple relational calculus and domain relational calculus with an example for each** | 10 | CO2 | Understand |
| 9 | **Employee(Person\_name, street, city)**  **Works(person\_name, company\_name, salary)**  **Company(company\_name, city)**  **Using the above relational database express the following queries in relational algebra notations.**   1. **Find the names of all the employees who live in city “Miami”.** 2. **Find the names of all the employees whose salary is greater than $100,000** 3. **Find the names of all the employees and who live in “Maimi” and whose salary is greater than $100,000.** | 10 | CO2 | Apply |
| 10 | **Employee(person\_name, street, city)**  **Works(person\_name, company\_name, salary)**  **Company(company\_name, city)**  **Using the above relational database express the following queries in relational algebra notations.**   1. **Find the names of all employees who works for “First Bank Corporation”** 2. **Find the names and cities of residence of all the employees who work for “First Bank Corporation”** 3. **Find the names, street address, and cities of residence of all employees who work for “First Bank Corporation” and earn more than $10,000.** | 10 | CO2 | Apply |

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| **UNIT – 3 (2 Marks)** | | | |
| **#** | **Questions** | **CO** | **BL** |
| 1 | **What are attributes? Give examples.** | CO2 | Remember |
| 2 | **Define weak and strong entity sets.** | CO2 | Remember |
| 3 | **What is functional dependency?** | CO2 | Remember |
| 4 | **What is normalization** | CO2 | Remember |
| 5 | **Mention the main differences between trivial and non-trivial dependencies.** | CO2 | Remember |
| 6 | **What are the properties of decompositions.** | CO2 | Remember |
| 7 | **Compare and contrast between third normal form and BCNF.** | CO2 | Understand |
| 8 | **What are the anomalies in bad design of database?** | CO2 | Remember |
| 9 | **Define multivalued functional dependency.** | CO2 | Remember |
| 10 | **What is redundancy?** | CO2 | Remember |

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| **UNIT – 3 (5/10 Marks)** | | | | |
| **#** | **Questions** | **M** | **CO** | **BL** |
| 1 | **Construct an E-R Diagram for a car insurance company whose customers own one or more cars each. Each car has associated with its zero to any number of recorded accidents. Each insurance covers one or more cars, and has one or more premium payments associated with it. Each payment is for a particular period, and has an associated due date, and the date when the payment was received.** | 10 | CO2 | APPLY |
| 2 | **Explain different types of relationships using crow’s foot notation.** | 10 | CO2 | APPLY |
| 3 | **A set of FD’s for the relation R {A, B, C, D, E, F} is AB→C, C→A, BC→D, ACD→B, BE→C, EC→FA, FC→BD, and D→E. Find a minimum cover for this set of FD’s?** | 10 | CO2 | APPLY |
| 4 | **What is ER diagram? Explain the terms of ER diagram and draw the ER diagram for library management system.** | 10 | CO2 | APPLY |
| 5 | **Explain about Multi-valued dependencies and Fourth Normal Form.** | 10 | CO2 | APPLY |
| 6 | **Draw an E-R diagram for a core banking enterprise system and identify the derived and composite attributes, the strong and weak entity sets, and relationships.** | 10 | CO2 | APPLY |
| 7 | **Explain 1NF, 2NF, 3NF and 4NF with suitable example.** | 10 | CO2 | APPLY |
| 8 | **Consider a relation R = {ABCDE}. The FD’s = {A →B, BC→E, ED→A} list all candidate keys for R?** | 10 | CO2 | APPLY |
| 9 | **Explain in detail about relationships, relationships sets, and its cardinalities** | 10 | CO2 | APPLY |
| 10 | **Define BCNF. How does BCNF differ from 3NF? Explain with an example** | 10 | CO2 | APPLY |

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| **UNIT – 4 (2 Marks)** | | | |
| **#** | **Questions** | **CO** | **BL** |
| 1 | **What are wait/die and wound/wait schemas?** | CO3 | Remember |
| 2 | **What is immediate database modification and deferred database modifications?** | CO3 | Remember |
| 3 | **What are the properties of a transaction?** | CO3 | Remember |
| 4 | **State Thomas’ write rule.** | CO3 | Remember |
| 5 | **What are the uses of Concurrency Control?** | CO3 | Remember |
| 6 | **Draw the state diagram of the transaction.** | CO3 | Remember |
| 7 | **When two schedules are conflict equivalent?** | CO3 | Remember |
| 8 | **What is transaction rollback?** | CO3 | Remember |
| 9 | **What is checkpoint?** | CO3 | Remember |
| 10 | **What are the uses of database buffering.** | CO3 | Remember |

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| **UNIT – 4 (5/10 Marks)** | | | | |
| **#** | **Questions** | **M** | **CO** | **BL** |
| 1 | **Explain about how concurrency can be controlled using time stamp methods.** | 10 | CO3 | Apply |
| 2 | **Demonstrate any two advanced recovery techniques and their uses.** | 10 | CO3 | Understand |
| 3 | **What is serializability? Explain in detail its types.** | 10 | CO3 | Apply |
| 4 | **What is Undo and Redo logging explain with examples.** | 10 | CO3 | Apply |
| 5 | **Explain different locking mechanisms used in lock based concurrency control.** | 10 | CO3 | Understand |
| 6 | **Explain storage structure and their access methods in detail.** | 10 | CO5 | Apply |
| 7 | **Explain in detail about log-based recovery.** | 10 | CO3 | Apply |
| 8 | **Illustrate multiple granularity locking algortihm with a suitable example** | 10 | CO3 | Understand |
| 9 | **Illustrate validation based Protocols with a suitable example.** | 10 | CO3 | Apply |
| 10 | **Explain Remote backup Systems.** | 10 | CO5 | Understand |

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| **UNIT – 5 (2 Marks)** | | | |
| **#** | **Questions** | **CO** | **BL** |
| 1 | **What is indexing and what are the different kinds of indexing?** | CO6 | Remember |
| 2 | **Mention any two differences between linear and extendible hashing.** | CO6 | Remember |
| 3 | **Why B+ tree efficient than B tree?** | CO6 | Remember |
| 4 | **What are the problems with static Hashing?** | CO6 | Remember |
| 5 | **What are the causes of bucket overflow in a hash file organization** | CO6 | Remember |
| 6 | **What can do to reduce the occurrence of bucket overflow?** | CO6 | Remember |
| 7 | **What is the basic difference between static hashing and dynamic hashing?** | CO6 | Remember |
| 8 | **Differentiate open hashing and closed hashing (overflow chaining).** | CO6 | Remember |
| 9 | **What is RAID?** | CO5 | Remember |
| 10 | **What is MTTF?** | CO5 | Remember |

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| **UNIT – 5 (5/10 Marks)** | | | | |
| **#** | **Questions** | **M** | **CO** | **BL** |
| 1 | **Explain about several types of ordered indexes.** | 10 | CO6 | Understand |
| 2 | **Briefly explain about B+ tree index file.** | 10 | CO6 | Apply |
| 3 | **Explain hash based indexing and tree based indexing with their data structures and indices.** | 10 | CO6 | Understand |
| 4 | **Explain about B+ - tree file organization with its data structure, search and deletion operations.** | 10 | CO6 | Apply |
| 5 | **Distinguish between Extendible and Linear Hashing with example.** | 10 | CO6 | Apply |
| 6 | **What is an index? What are the different types of indexes? Discuss important properties of an index that affect the efficiency of search.** | 10 | CO6 | Understand |
| 7 | **Explain difference between Hash indexes and B+-tree indexes. In particular, Demonstrate equality and range searches work, using an example.** | 10 | CO6 | Apply |
| 8 | **Explain static and dynamic hashing techniques.** | 10 | CO6 | Understand |
| 9 | **Discuss about clustered, primary and secondary indices in detail.** | 10 | CO6 | Understand |
| 10 | **Compare and contrast different types of file organizations.** | 10 | CO5 | Understand |

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