

**ADITYA ENGINEERING COLLEGE (A)****B.Tech - IV Semester End Examinations (AR23)****DATABASE MANAGEMENT SYSTEMS****(Common to CSE, IT, AIML & CSE(DS))****Time: 3 hours****Max. Marks: 70****1. Answer all 10 questions from Section-A. Each question carries 2 marks.****2. Answer one question from each unit in Section-B. Each question carries 10 marks.****SECTION –A****10 X 2 =20**

- |   |   |   |    |     |      |
|---|---|---|----|-----|------|
| 1 | a | Define a database system and mention its key characteristics                      | L1 | CO1 | [2M] |
|   | b | What is data independence in DBMS?  | L1 | CO1 | [2M] |
|   | c | List the different types of integrity constraints in the relational model.        | L2 | CO2 | [2M] |
|   | d | What is the difference between a domain and an attribute in the relational model? | L1 | CO2 | [2M] |
|   | e | What is the purpose of the WHERE clause in SQL queries?                           | L1 | CO3 | [2M] |
|   | f | Explain nested query in SQL?  | L2 | CO3 | [2M] |
|   | g | Explain the concept of lossless join decomposition                                | L2 | CO4 | [2M] |
|   | h | What is a multivalued dependency in database design?                              | L1 | CO4 | [2M] |
|   | i | List the different states of a transaction  | L2 | CO5 | [2M] |
|   | j | Define deadlock in the context of databases                                       | L2 | CO5 | [2M] |

**SECTION –B****5 X 10 =50****UNIT-I**

- |   |   |  |    |     |      |
|---|---|--|----|-----|------|
| 2 | a | Differentiate database systems and file systems in terms of data integrity, security, and redundancy, with suitable examples | L3 | CO1 | [5M] |
|   | b | Explain different data models with examples and discuss their relevance in modern database systems.                          | L2 | CO1 | [5M] |

**OR**

- |   |   |   |    |     |      |
|---|---|---|----|-----|------|
| 3 | a | Illustrate different types of attributes with examples for each one.  | L2 | CO1 | [5M] |
|   | b | Explain the concepts of specialization and generalization in ER modeling and analyze their impact on database design. | L2 | CO1 | [5M] |

**UNIT-II**

- |   |   |   |    |     |      |
|---|---|---|----|-----|------|
| 4 | a | Write SQL commands to create, alter, and modify a table schema for a student database and analyze their impact.                     | L3 | CO2 | [5M] |
|   | b | Explain various types of constraints in a relational model with examples and discuss their importance in ensuring data consistency. | L2 | CO2 | [5M] |

**OR**

- |   |   |  |    |     |      |
|---|---|--|----|-----|------|
| 5 | a | Explain different types of constraints in sql with suitable example for each one   | L2 | CO2 | [5M] |
|   | b | Illustrate the importance of null values in relational databases and demonstrate scenarios where they are useful or problematic. | L3 | CO2 | [5M] |

**(P.T.O)**

### UNIT-III

- 6      a      Illustrate nested queries and subqueries with examples highlighting their use cases.      L3      CO3      [5M]
- b      Explain the use of GROUP BY and HAVING clauses in SQL for data aggregation, and analyze the impact on query performance.      L2      CO3      [5M]

**OR**

- 7      a      Identify and explain different types of joins and explain the results with suitable examples.      L2      CO3      [5M]
- b      Explain nested queries and subqueries with examples highlighting their use cases.      L3      CO3      [5M]

### UNIT-IV

- 8      a      Illustrate different types of normal forms explain with suitable example for each type.      L2      CO4      [5M]
- b      Apply the concept of functional dependencies to determine the highest normal form of a given relation      L3      CO4      [5M]

**OR**

- 9      a      Discuss the trade-offs between normalization and denormalization in real-world database applications      L2      CO4      [5M]
- b      Apply the concept of surrogate keys to resolve data anomalies in schema design with an example      L3      CO4      [5M]

### UNIT-V

- 10     a      Demonstrate with an example how a transaction progresses through different states and ensure ACID properties are maintained.      L3      CO5      [5M]
- b      Interpret various concurrency control techniques and compare their effectiveness in handling simultaneous transactions.      L3      CO5      [5M]

**OR**

- 11     a      Explain impact of using B+ tree indexing in query optimization with practical scenarios      L3      CO5      [5M]
- b      Explain the recovery process in databases by analyzing different recovery algorithms such as log-based and shadow paging.      L3      CO5      [5M]

\*\*\*\*\*