



Roll No:

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**BTECH**  
**(SEM III) THEORY EXAMINATION 2023-24**  
**BASICS OF DATABASE MANAGEMENT SYSTEMS**

TIME: 3HRS

M.MARKS: 70

**Note:** 1. Attempt all Sections. If require any missing data; then choose suitably.

**SECTION A**

1. Attempt *all* questions in brief.

2 x 7 = 14

Q no.	Question	Marks	C O
a.	Define the terms "data model schema" and "data model instance".	2	1
b.	Describe the notation used in an ER diagram.	2	1
c.	Define the Relational Data Model.	2	2
d.	What are integrity constraints in the Relational Data Model?	2	2
e.	What is SQL (Structured Query Language).	2	3
f.	Define functional dependencies.	2	4
g.	Define a transaction in the context of database management.	2	5

**SECTION B**

2. Attempt any *three* of the following:

7 x 3 = 21

a.	Describe the processes of generalization, aggregation, and reduction in an ER diagram, highlighting their purpose and impact on database design.	7	1
b.	Describe the different types of constraints in the Relational Data Model, including key constraints and domain constraints, and provide examples of each.	7	2
c.	Provide examples of SQL INSERT, DELETE, and UPDATE statements. Explain how each statement is used to modify data in a database table.	7	3
d.	Explain the concept of lossless join decomposition in the context of normalization. What conditions must be satisfied for a decomposition to be lossless join?	7	4
e.	Explain the concept of two-phase locking (2PL) techniques for concurrency control. How does 2PL ensure serializability of transactions, and what are its advantages and limitations?	7	5

**SECTION C**

3. Attempt any *one* part of the following:

7 x 1 = 7

a.	Describe the overall structure of a database system, including the various levels of data abstraction and the interaction between them.	7	1
b.	Describe the process of reducing an ER diagram to relational tables, including the steps involved and potential challenges in the transformation process.	7	1



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4. Attempt any *one* part of the following:

7 x 1 = 7

a.	Explain the unary relational operations in Relational Algebra, focusing on the SELECT and PROJECT operations. Provide examples to illustrate their usage.	7	2
b.	What are binary relational operations in Relational Algebra? Describe the CROSS and JOIN operations, highlighting their differences and use cases.	7	2

5. Attempt any *one* part of the following:

7 x 1 = 7

a.	Explain the different types of SQL joins (e.g., INNER JOIN, LEFT JOIN, RIGHT JOIN, FULL JOIN) and provide examples of each.	7	3
b.	What is a view in SQL, and how is it used to simplify database management? Provide examples of creating and using views in SQL.	7	3

6. Attempt any *one* part of the following:

7 x 1 = 7

a.	Explain the concept of a minimal cover for a set of functional dependencies. How is a minimal cover derived, and why is it important in the normalization process?	7	4
b.	Describe multi-valued dependencies (MVDs) and their role in database normalization. What is the fourth normal form (4NF), and how does it address MVDs?	7	4

7. Attempt any *one* part of the following:

7 x 1 = 7

a.	What is serializability of transaction scheduling, and why is it important in database concurrency control? How can you determine if a transaction schedule is serializable?	7	5
b.	Provide examples of transaction schedules and analyze whether they are conflict serializable and/or view serializable. Identify any conflicts or dependencies between transactions and determine if the schedules are serializable.	7	5