PAPER ID-410164

Subject Code: KOE067

Roll No: | | | | | | | | | | | | | |

BTECH

(SEM VI) THEORY EXAMINATION 2023-24

BASICS OF DATA BASE MANAGEMENT SYSTEM

TIME: 3 HRS **M.MARKS: 100**

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

SECTION ASS

1. Attempt *all* questions in brief.

a.	Define the terms super key, candidate key and primary key.	02
b.	Define schema and instance in the context of a database. How do they differ?	02
c.	Define and differentiate between entity integrity and referential integrity.	02
d.	Describe relational algebra and its significance in relational databases.	02
e.	What are views and indexes in SQL?	02
f.	Explain the process of creating and altering tables in SQL.	02
g.	Describe the concepts of serializability in transaction processing.	02
h.	Discuss the two-phase commit protocol in distributed database systems.	02
i.	Explain the role of backup and recovery techniques in database security.	02
j.	Discuss the importance of spatial and temporal databases in modern database management systems.	02

SECTION B

2. Attempt any *three* of the following:

a.	Discuss the concepts of generalization and aggregation in the ER model. Provide examples to explain how these concepts are used to simplify and organize complex data relationships and how they can be represented in an ER diagram.	10
b.	Compare and contrast tuple relational calculus and domain relational calculus. Provide examples to demonstrate how queries are formulated in each type of relational calculus.	10
c.	Explain the concept of database triggers in PL/SQL. Discuss the different types of triggers (BEFORE, AFTER, INSTEAD OF) and provide examples of how triggers can be used to enforce business rules and maintain data integrity.	10
d.	Explain log-based recovery in a database management system. Discuss the purpose of logs, different types of logs (e.g., undo log, redo log), and how checkpoints are used in conjunction with logs to facilitate efficient recovery from transaction failures.	10
e.	Compare and contrast centralized and client-server architectures in database management systems. Discuss the advantages and disadvantages of each architecture, including scalability, performance, and ease of maintenance.	10

SECTION C

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

a.	Explain the process of transforming an Entity-Relationship (ER) diagram into relational tables. Use an example to illustrate how entities and relationships are converted into tables and how primary keys and foreign keys are used to maintain relationships between tables.	10
b.	Detail the roles and responsibilities of a database administrator (DBA). Explain how a DBA ensures database security, performance, and recovery, and describe the tools and techniques they might use to perform these tasks.	10

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

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a.	Explain the concept of functional dependencies and their role in the normalization process. Discuss how functional dependencies are used to identify normal forms and provide examples to illustrate the first, second, and third normal forms.	10
b.	What is a lossless join decomposition in the context of database normalization? Explain the criteria for a decomposition to be lossless and provide an example of how a relational schema can be decomposed in a way that preserves data integrity.	10

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

a.	Explain the concept of joins in SQL and describe the different types of joins (inner join, left join, right join, full outer join). Provide SQL examples for each type of join and discuss scenarios where each would be appropriately used	10
b.	Explain the transaction control commands in SQL (COMMIT, ROLLBACK, SAVEPOINT). Discuss the importance of transactions in maintaining data integrity and consistency, and provide examples of how these commands are used in practice.	10

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

a.	Describe time-stamping protocols for concurrency control. Explain how time stamps are assigned and used to manage the order of transactions and discuss the benefits and potential drawbacks of using time-stamping protocols.	10
b.	Describe multi-version concurrency control (MVCC) in a database management system. Explain how MVCC allows for multiple versions of data items and discuss the advantages of MVCC over single-version techniques. Provide examples to illustrate how MVCC handles concurrent transactions.	10

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

a.	Explain the different levels of security in a database environment, including physical security, operating system (OS) security, network security, and DBMS security. Discuss the measures taken at each level to protect against unauthorized access, data breaches, and other security threats.	10
b.	Explain the concepts of data mining, data warehousing, and decision support systems (DSS) in the context of database management systems.	10