

**Indian Institute of Information Technology Vadodara**

**B.Tech. (CSE&IT): Semester IV (Winter 2023)**

**CS204 – Database Management System**

**End-Semester Exam**

**Total Marks: 45**

**Time: 180 Minutes**

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**Note:** All questions are compulsory. No query is entertained in the exam hall. In case taking any assumption, kindly highlight it before answers the question.

**Questions**

1. Consider the following relation, normalize it, and discuss all the steps involved, in detail. (5)

OrderBook (Order, Product, Quantity, UnitPrice, Customer, Address)

with following dependencies: Order→Customer, Customer→Address, Product→UnitPrice

2. Differentiate between Lossy and Lossless decomposition with appropriate example. Give an example of multi-valued dependency. (5)

3. Give the Pros and Cons of Relational, NoSQL, and NewSQL databases. (5)

4. Discuss different types of NoSQL databases. How ACID-like guarantees will be implemented in the distributed databases. Give an example wherever applicable. (5)

5. What are the challenges in managing concurrency in the relational DBMS? How we can address these challenges? (5)

6. Explain the following terms considering NewSQL databases. (5)

- (a). Serializability
- (b). Buffer pool overhead
- (c). Single threading
- (d). Failover and failback operations
- (e). Write-ahead logging

7. Construct an ER Diagram for a Company having the following details: (8)

The Company is organized into DEPARTMENTS. Each department has a unique name and a particular employee who manages the department. The start date for the manager is recorded. The Department may have several locations.

A department controls a number of PROJECT. Projects have a unique name, number and a single location.

Company's EMPLOYEE name, ssno, address, salary, sex, and birth date are recorded. An employee is assigned to one department but may work on several projects (not necessarily controlled by her department). A number of hours/week an employee works on each project is recorded; The immediate supervisor for the employee.

Employee's DEPENDENT are tracked for health insurance purposes (dependent name, birthdate, relationship to employee).

✓ 8. Translate the following ER Diagram into a relational scheme.

(7)

