



# SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107



## AN AUTONOMOUS INSTITUTION

Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai

### 23ITB204 – Modern Database Management System

#### ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

#### III Semester

16 Marks

1. Apply the concept of Join Dependencies in Fifth Normal Form (5NF) to a complex relational schema. Explain how join dependencies are identified and resolved to achieve 5NF.
2. Analyze the differences between First, Second, and Third Normal Forms (1NF, 2NF, 3NF) with the help of examples. How do these normal forms improve database design by minimizing redundancy?
3. Illustrate the key differences between timestamp-based concurrency control and multiversion concurrency control (MVCC) through examples. In which practical scenarios would you recommend using one method over the other?
4. Explain how the ACID properties (Atomicity, Consistency, Isolation, Durability) play a crucial role in managing transactions in databases. Provide examples to illustrate how these properties ensure reliable and error-free transaction processing.
5. Evaluate the differences between deferred and immediate update recovery techniques. Explain how each approach handles transaction failures and maintains database consistency during recovery.
6. Interpret the ARIES recovery algorithm and evaluate its effectiveness in managing crash recovery. Discuss its key features, such as write-ahead logging, checkpointing, and transaction undo/redo operations.
7. Analyze the differences between First, Second, and Third Normal Forms (1NF, 2NF, 3NF) with the help of examples. How do these normal forms improve database design by minimizing redundancy?
8. Apply the concept of Boyce-Codd Normal Form (BCNF) to a given relational schema. Identify any violations of BCNF, and demonstrate how the schema can be decomposed into BCNF-compliant relations.
9. Explain the concept of serializability in transaction schedules. Evaluate different types of schedules (serial and non-serial) and discuss their impact on the consistency of the database.
10. Examine the concept of deadlock in transaction management. Evaluate different deadlock handling techniques (such as prevention, detection, and recovery) and discuss their effectiveness in database systems..
11. Evaluate the importance of ACID properties in transaction management. Explain how each property (Atomicity, Consistency, Isolation, Durability) ensures reliable transaction processing in database systems

12. Determine the need for concurrency in database systems. How does concurrency improve performance, and what are the challenges it introduces in transaction management?

13. What is Shadow Paging in database recovery? Explain its advantages and limitations with examples.

14. Discuss Deadlock Handling techniques in databases. Explain different methods to prevent, detect, and recover from deadlocks.

15. What is Snapshot Isolation? How does it differ from other concurrency control mechanisms? Explain with examples.