D1ACA2503 **(1 Page)** **Name.....**
Reg.No.....

FIRST SEMESTER M.C.A. DEGREE EXAMINATION, NOVEMBER 2025
M.C.A.
MCA25103 - ADVANCED DATABASE TECHNOLOGIES

Time: 3 Hours **Maximum Marks: 100**

Answer any *five* questions. Each carries *twenty* marks.

1. a) Explain the steps for mapping an ER model to a relational schema. Give an example showing how entities and relationships are converted.
   b) Explain the difference between simple, composite, derived, and multi-valued attributes with examples.
2. a) How does normalization prevent anomalies like insertion, deletion, and update problems? Give examples.
   b) Explain static hashing and bitmap indices. How do they improve data retrieval efficiency?
3. a) What are conflict and view serializability? Explain their significance in concurrency control.
   b) Define Distributed Database System (DDBS). Discuss its characteristics and challenges in implementation.
4. a) Explain the NoSQL storage architecture in detail.
   b) Describe different types of NoSQL databases.
5. a) Discuss the role of Data Manipulation Language (DML) commands in SQL. Explain how data can be inserted, updated, deleted, and retrieved from a table with suitable examples.?
   b) Explain the CRUD operations in NoSQL databases.
6. a) What are Key/Value stores? Explain how Redis works as an in-memory data store and discuss its main data structures and commands with examples.
   b) Explain the necessary and sufficient conditions for 1NF, 2NF and 3NF with simple examples.
7. a) What are entities? Differentiate weak and strong entity with suitable examples.
   b) Explain the concept of database recovery. Describe the steps involved in the recovery process using log records.

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(5 × 20 = 100 Marks)