

Enrollment No./Seat No.:

GUJARAT TECHNOLOGICAL UNIVERSITY
BCA/MCA INTEGRATED - SEMESTER - II EXAMINATION - SUMMER 2025

Subject Code: BC02001021

Date: 02-06-2025

Subject Name: Database Management System

Time: 10:30 AM TO 01:00 PM

Total Marks: 70

Instructions

- 1. Attempt all questions.**
- 2. Make suitable assumptions wherever necessary.**
- 3. Figures to the right indicate full marks.**
- 4. Use of simple calculators and non-programmable scientific calculators are permitted.**

	Marks
Q.1 (a) Define the term (Each Carries 1 Mark). 1. What are the three levels in the three-schema architecture? 2. Name two actors on the scene in a database system. 3. What is an attribute? 4. What is a composite attribute? 5. Define Boyce-Codd Normal Form. 6. What is normalization? 7. What is cascading rollback?	07
(b) Describe the advantages of using the Database Management System (DBMS) approach? Give Suitable Examples too.	07
Q.2 (a) What are keys in ER- Models? Differentiate between primary key and candidate key?	07
(b) Draw and Explain an ER diagram for a Student database with entities : Student, Department , admission and course .	07

OR

(b) Define Class Diagram ? Explain its purpose and Describe the icons used for class relationship	07
Q.3 (a) Discuss the problems caused by redundancy in a relational database. Explain the purpose of normalization in a database and how it helps in eliminating redundancy.	07
(b) Consider a relation R(A, B, C, D, E, F, G, H, I, J) and the following functional dependencies (FDs): <ul style="list-style-type: none">• $AB \rightarrow C$• $A \rightarrow D, E$• $B \rightarrow F$• $F \rightarrow G, H$• $D \rightarrow I, J$ Answer the following: <ol style="list-style-type: none">1. Find the candidate key(s) of the relation.2. Decompose the relation into 2NF. Then decompose the result into 3NF.	07

OR

- (a) What is Fourth Normal Form (4NF)? How does it relate to multi valued dependencies? 07
- (b) Discuss the characteristic of relations . Also Define the following term . 07
- a. Relation State
 - b. Relation Schema
 - c. Atomic
 - d. Domain

- Q.4 (a)** Consider the following relational database schema consisting of the three relation schemas: 07
- Student (sid, sname, gender, city)
 Department (deptid, deptname)
 Course (cid, cname)

- a. Retrieve the names of all students who live in 'Ahmedbad '.
- b. Find all students who are female..
- c. Get the names of all departments.
- d. List all the courses offered.
- e. Find all students who are not from 'Delhi.
- f. Get student IDs and names of male students.
- g. Find students who are from either 'Trivandrum' or 'Bangalore'.

- (b) Discuss the Various types of Binary Relational Operations with suitable examples? 07

OR

- (a) Explain aggregate functions and grouping in relational algebra. How are operations like COUNT, SUM, AVG performed over grouped data? 07
- (b) Explain the key concepts of the Relational Model. How do relations, tuples, and attributes contribute to the structure of a relational database? 07

- Q.5 (a)** What are the ACID properties of a transaction? Explain each property in detail. 07
- (b) What is the role of a transaction log in transaction processing? How does it help in recovery? 07

OR

- (a) What is serializability in DBMS? Explain its importance and describe the different types of schedules used to determine serializability. 07
- (b) Describe the different states in the lifecycle of a transaction with the help of a diagram. Explain each state of transaction execution in detail. 07

Enrollment No./Seat No.:

GUJARAT TECHNOLOGICAL UNIVERSITY
BCA/MCA INTEGRATED - SEMESTER - II EXAMINATION - WINTER 2025

Subject Code: BC02001021

Date: 01-12-2025

Subject Name: Database Management System

Time: 02:30 PM TO 05:00 PM

Total Marks: 70

Instructions

- 1. Attempt all questions.**
- 2. Make suitable assumptions wherever necessary.**
- 3. Figures to the right indicate full marks.**
- 4. Use of simple calculators and non-programmable scientific calculators are permitted.**

	Marks
Q.1 (a) Do as directed.	07
1) Define Database.	
2) Define Entity.	
3) Define Primary Key.	
4) BCNF Stand for _____.	
5) Full Form of DML.	
6) Full Form of ERD.	
7) Difference between strong entity and weak entity.	
(b) What is DBMS? Explain advantages and disadvantages of DBMS Approach.	07
Q.2 (a) List classifications of Database Management Systems. Explain any two in detail.	07
(b) What is ER diagram? Explain its notation in detail.	07
OR	
(b) Define Query Language. Explain DDL, DML and DCL in detail.	07
Q.3 (a) What do you mean by Normalization? Explain 1NF, 2NF and 3NF.	07
(b) Define Join. List and explain types of Join.	07
OR	
(a) Discuss Generalization and Specialization with diagram.	07
(b) Explain Multivalued Dependency and 4NF with proper example.	07
Q.4 (a) Explain Union, Intersection and Difference(Minus) operations with suitable example.	07
(b) Explain Aggregate Functions with Example.	07
OR	
(a) Write a short note on: Entity Integrity, Referential Integrity and Foreign Keys.	07
(b) Explain the SELECTION and PROJECTION Unary Relational Operations.	07
Q.5 (a) List and explain the ACID properties of transaction with example.	07
(b) Define Transaction. Draw and Explain Transaction state diagram in detail.	07

OR

- (a)** Discuss Characterizing Schedule Based on Serializability in detail with appropriate example. **07**
- (b)** Draw UML Class Diagram on Railway Reservation System. **07**
