

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER-III EXAMINATION – WINTER 2025

Subject Code:3130703

Date:15-12-2025

Subject Name: Database Management Systems

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. Simple and non-programmable scientific calculators are allowed.

		MARKS
Q.1	(a) Define following terms. 1. Schema 2. Instance 3. Physical Data Independence	03
	(b) Explain three level architecture of DBMS.	04
	(c) What is integrity constraint? Explain primary key, reference key and check constraint with SQL syntax.	07
Q.2	(a) What is Data Definition Language? List DDL statements and explain anyone with an example.	03
	(b) Describe (1) Union and (2) Cartesian Product operations in relational algebra.	04
	(c) Explain the advantages of Database Management Systems over file processing system.	07
	OR	
	(c) List the type of Database Users. Explain their characteristics in brief. How they interact with DBMS?	07
Q.3	(a) List and explain mapping cardinalities of E-R diagram with example.	03
	(b) Briefly explain Generalization and Specialization in E-R diagram.	04
	(c) What is Normalization? Explain 1NF, 2NF and 3NF with suitable example.	07
	OR	
Q.3	(a) What is Functional Dependency? Explain armstrong's axioms.	03
	(b) Differentiate Sparse and Dense index in DBMS with example.	04
	(c) Draw E-R diagram for a University Management System with the necessary assumption.	07
Q.4	(a) List and explain different types of locks in transactions.	03
	(b) Draw and explain transaction state diagram.	04
	(c) Discuss various steps of query processing with diagram.	07
	OR	
Q.4	(a) Discuss conflict serializability in transactions.	03
	(b) List and describe ACID property of transactions.	04
	(c) Explain the two-phase locking protocol in detail.	07

- Q.5 (a)** What is log-based recovery? List and explain various fields use in log records for log-based recovery. **03**
- (b)** Write a PL/SQL function which takes 3 integer numbers as parameters and return an average of same. **04**
- (c)** What is a deadlock? How to detect deadlock? Explain with example. **07**
- OR**
- Q.5 (a)** Define following terms. **03**
1. Cascading Rollback
 2. Candidate Key
 3. View
- (b)** Describe Grant and Revoke commands with suitable example. **04**
- (c)** Write SQL queries for the following: **07**
1. Create table Employee, Department and Location with following schema and appropriate data types and constraints.
 - a) Employee (employee_id, name, email, hire_date, salary, department_id, location_id)
 - b) Department (department_id, department_name)
 - c) Location (location_id, street_address, postal_code, country)
 2. Add new column 'city' in the location table.
 3. Find all the details of employees whose name starts with or ends with 's'.
 4. Update the postal_code to '220212' where the country is 'India' and location_id is between 2 to 7.
 5. Delete all the records of Location table.
