

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.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER-III (NEW) EXAMINATION – WINTER 2024

Subject Code: 3130703

Date: 29-11-2024

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.	03
i) Database Management System	
ii) Instance	
iii) Logical Data independence	
(b) List and explain categories of database users. Describe roles and responsibilities of database administrator.	04
(c) Compare the advantages of using a Database Management System (DBMS) over a file processing system.	07
Q.2 (a) Explain generalization and specialization with neat diagram	03
(b) Explain following attributes. a. Single Valued b. Multivalued c. Derived attribute d. Composite attribute	04
(c) Draw an E-R diagram of following scenario. Make necessary assumptions and clearly note down the assumptions. Municipal Corporation/any Bus reservation system should be digitize.	07
OR	
(c) Explain the concepts of strong entity and weak entity using real world example.	07
Q.3 (a) Explain the terms.	03
i) Super Key	
ii) Foreign Key	
iii) Unique Key	
(b) Explain trivial functional dependencies with suitable example.	04
(c) Consider a relation R(A, B, C, D, E) with the following three functional dependencies. $AB \rightarrow C$; $BC \rightarrow D$; $C \rightarrow E$; Find out the number of superkeys in the relation R.	07
OR	
Q.3 (a) Explain insertion and deleting anomalies with respect to normalization.	03
(b) Explain Armstrong's axioms in detail.	04
(c) Given a relation R(P, Q, R, S, T) and Functional Dependency set $FD = \{ PQ \rightarrow R, S \rightarrow T \}$, determine whether the given R is in 2NF? If not convert it into 2 NF.	07

- Q.4** (a) Illustrate various storage strategies. **03**
(b) Explain authorization and authentication with respect to database security. **04**
(c) Which kind of queries are solved using division operator? Explain in detail. **07**

OR

- Q.4** (a) Differentiate dynamic hashing and static hashing **03**
(b) Explain ACID properties of transaction. **04**
(c) Describe query processing with neat diagram. **07**

- Q.5** (a) Explain working of two phase locking protocol. **03**
(b) Explain GRANT, REVOKE and SAVEPOINT commands with suitable example. **04**
(c) Assume table CUSTOMER (Cust_Id, Customer_name, Age, Address, Salary). **07**
Write a PL/SQL function which gives total number of customers having salary more than one lac per month.

OR

- Q.5** (a) Differentiate between conflict and view serializability with respect to transaction. **03**
(b) Categorize joins in the SQL. Explain each with suitable example. **04**
(c) Write a PL/SQL trigger where employee of "GTU Private Ltd." **07**
company cannot update database on 23-Dec-2024 due to maintenance.

Seat No.: _____

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GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-III (NEW) EXAMINATION – WINTER 2023

Subject Code:3130703

Date:18-01-2024

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 Superkey, Candidate Key and Primary Key.	03
	(b) Enlist advantages of Database Management Systems over traditional File System	04
	(c) Explain DBMS architecture with a neat sketch.	07
Q.2	(a) Differentiate terms relation and relation schema with suitable example.	03
	(b) List various integrity constraints in relational model. Explain referential integrity constraint with suitable example.	04
	(c) Briefly explain generalization and specialization in E-R diagram with suitable example.	07
	OR	
	(c) Differentiate Weak Entity and Strong Entity with suitable example. Also draw a sample E-R diagram which depicts weak entity.	07
Q.3	(a) What is functional dependency? Explain armstrong's axioms.	03
	(b) Consider following relations and write queries in the form of relational algebra. Students(std_id, std_name, semester, dept_id) Departments(dept_id, dept_name, no_of_faculties)	04
	1) List names of students studying in "Computer" department. 2) Display all information of the student whose name is "Pratik"	
	(c) What is normalization? Explain 2NF, 3NF and BCNF with suitable examples.	07
	OR	
Q.3	(a) Let R = (A, B, C, D, E, F) be a relation schema with the following dependencies- $C \rightarrow F$ $E \rightarrow A$ $EC \rightarrow D$ $A \rightarrow B$	03
	What is the Candidate key of the relation R?	
	(b) Consider following relations and write queries in the form of relational algebra. Accounts(acc_no, acc_name, balance, bank_id) Bank(bank_id, bank_name, city)	04
	1) List all Account Numbers in "HDFC" bank.	

- 2) List all bank names in “Ahmedabad” city.
- (c) Consider the relation Employees(empId, empName, carName, parkingSlot) with dependencies $F = \{empId \rightarrow carName, empId \rightarrow empName, carName \rightarrow parkingSlot\}$. **07**
- Does the above table appear in 3NF? If not, normalize it in 3NF.
- Q.4** (a) List and explain ACID properties with respect to Database transaction. **03**
 (b) Write a short note on Intrusion Detection in DBMS. **04**
 (c) Discuss various steps of query processing with diagram. **07**
- OR**
- Q.4** (a) List and explain different types of locks in transactions. **03**
 (b) Write a short note on SQL injection. **04**
 (c) What do you mean by Serializable Schedule? Explain View Serializability with example. **07**
- Q.5** (a) What is a trigger? List various types of triggers and explain any one with example. **03**
 (b) Differentiate Sparse and Dense dense index in DBMS with example. **04**
 (c) Consider the following tables and answer the queries in SQL. **07**
- Books (isbn_no, title, publisher_id, year)
 Authors (author_id, author_name, country, city)
 Publishers (publisher_id, publisher_name, city)
 WrittenBy (isbn_no, author_id)
- 1) List all the books published after 1998.
 2) Update the city of author to “Baroda” whose author id is 10.
 3) List all the book titles written by author “korth”
 4) Add column “price” in the table Books.
 5) Display number of Publishers from the city “Ahmedabad”.
 6) List all the books published by “McGaw Hill”
 7) Display all publishers in the ascending order of their name.
- OR**
- Q.5** (a) What is a cursor? Differentiate implicit and explicit cursor with example. **03**
 (b) Differentiate open and closed hashing in DBMS. **04**
 (c) Consider the following tables and answer the queries in SQL. **07**
- Products(prod_id, prod_name, category, price)
 Customers(cust_id, cust_name, country, city)
 Orders(order_id, cust_id, prod_id, order_date, quantity)
- 1) List all the products having price less than 2000.
 2) Update price of a product to 3000 whose product id is 43.
 3) Display names of customer who have placed atleast one order.
 4) Display customer id and total number of orders placed by them.
 5) List all Customers in the descending order of their city.
 6) Display names of customers who have ordered “Television” (Product Name)
 7) Remove column “category” from the Products table.

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER– III(NEW) EXAMINATION – WINTER 2022****Subject Code:3130703****Date:24-02-2023****Subject Name:Database Management Systems****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. Simple and non-programmable scientific calculators are allowed.

MARKS

- Q.1** (a) Define following terms. **03**
- i) Data Abstraction
 - ii) Instance
 - iii) Logical Data independence
- (b) List the type of database users. Explain their characteristics in brief, how they interact with DBMS? **04**
- (c) State the advantages of Database management systems over file processing system. **07**
- Q.2** (a) Differentiate generalization and specialization. **03**
- (b) What are the types of attributes used in ER diagram? **04**
- (c) Draw an E-R diagram of following scenario. Make necessary assumptions and clearly note down the assumptions. **07**
- We would like to make college's semester fee collection system fully computerized. Fees may include your term fees , library fees, gymkhana fees etc..
- OR**
- (c) Explain the concept of total participation, partial participation ,strong entity set and weak entity set using ER diagram. **07**
- Q.3** (a) Define the terms. **03**
- i) Primary Key
 - ii) Unique Key
 - iii) Foreign Key
- (b) Explain transitive and trivial functional dependencies. **04**
- (c) Suppose a relational schema R (A B C D E) and set of functional dependencies **07**
- F: { A → B
B → E
C → D }
- Check out that relation is in 3NF or not? If not decompose it in 3NF
- OR**
- Q.3** (a) What is the significance of normalization? **03**
- (b) Explain Armstrong's axioms. **04**
- (c) Suppose a relational schema R (A B C D E F G H I) and set of functional dependencies **07**

F: {AB → C,
AD → GH,
BD → EF,
A → I,
H → J }

Check out that relation is in 3NF or not? If not decompose it in 3NF.

- Q.4** (a) List the type of storages in DBMS. Explain in brief: indexed based accessing. **03**
(b) Explain authorization and authentication with respect to database security. **04**
(c) Which type of queries would be solved by Division operator? Explain with examples. **07**

OR

- Q.4** (a) Write short note on : Hashing technique. **03**
(b) Explain ACID properties of transaction. **04**
(c) With neat diagram steps involved in query processing. **07**
- Q.5** (a) Explain the concept of deadlock in brief. **03**
(b) Explain GRANT and REVOKE commands with suitable example. **04**
(c) Write a PL/SQL function which takes 3 integer numbers as a parameters and return an average of same. **07**

OR

- Q.5** (a) Differentiate between Conflict and View Serializability with respect to transaction(any three differences) . **03**
(b) Enlist types of joins. Explain each with SQL syntax. **04**
(c) **07**

TABLE Bonus(WORKER_REF_ID INT,BONUS_AMOUNT
INT(10),BONUS_DATE DATETIME,FOREIGN KEY
(WORKER_REF_ID),REFERENCES Worker(WORKER_ID));

TABLE Title(WORKER_REF_ID INT,WORKER_TITLE
CHAR(25),AFFECTED_FROM DATETIME,FOREIGN KEY
(WORKER_REF_ID)REFERENCES Worker(WORKER_ID));
Consider above 3 tables ,assume appropriate data and solve
following SQL queries

1. Write an SQL query to fetch "FIRST_NAME" from Worker table using the alias name as <WORKER_NAME>
2. Write an SQL query to fetch "FIRST_NAME" from Worker table in uppercase.
3. Write an SQL query to print all Worker details from the Worker table order by FIRST_NAME Ascending.
4. Write an SQL query to print details of the Workers whose FIRST_NAME ends with 'h' and contains six alphabets.
5. Write an SQL query to print details of the Workers who are also Managers.
6. Write an SQL query to fetch departments along with the total salaries paid for each of them.
7. Write an SQL query to fetch the names of workers who earn the highest salary.
