



Daffodil International University

Faculty of Science & Information Technology

Department of Computer Science & Engineering

Midterm Examination, Spring 2026

Course Code: CSE311, Course Title: Database Management System

Level: 3 Batch: ~~2024~~

Time: 01:30 Hrs

Marks: 25

Answer ALL Questions [Optional]

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]

1.	a) The city of Greenfield has decided to modernize its public library system. The system must store and manage information about books, members, staff, and borrowing activities. Greenfield has multiple library branches across the city. Each branch has a unique branch ID, a name, an address, and a contact number. Each branch employs several staff members, but one staff member is assigned as the branch manager. The library stores thousands of books. Each book has an ISBN, title, publication year, and price. A book can have multiple authors, and an author can write multiple books. Each author has an author ID, name, and nationality. Since the library may have multiple copies of the same book, each physical copy has a unique copy ID and a status (available, issued, damaged). Each copy belongs to one branch. People can register as members of the library. Each member has a unique member ID, name, date of birth, email, phone number, and membership date. A member can borrow multiple book copies, but cannot borrow more than 5 books at a time. When a member borrows a book copy, the system records the issue date, due date, and return date. If the book is returned late, a fine is calculated. Each borrowing transaction is handled by a staff member. Additional Rules: • A branch can have many staff members, but each staff member works at only one branch. • Each branch has exactly one manager (who must be a staff member of that branch). • A book must have at least one author. • A member may borrow many book copies over time, but each borrowing record is for one specific copy. • A copy cannot be borrowed by more than one member at the same time. Draw the ER diagram.	8	CO3
	b) Relational Schema Diagram with Primary Keys and Foreign Keys clearly marked.	4.5	

2.	An online bookstore wants to manage its system using a database. The database contains the following tables: Customers, Books, Orders, Order_Items. - Write a SQL query to display the names and emails of all customers who live in New York. - Write a SQL query to display all books that cost more than 20. - Write a SQL query to display the total number of orders placed by each customer. - Write a SQL query to find the top 3 most expensive books in the store. - Write a SQL query to find the customer who has spent the highest total amount across all their orders.	7.5	CO2
3.	A bank uses a relational database system such as Oracle Database to manage customer accounts and transactions. A customer, Rahul, transfers ₹50,000 from his Savings Account (Account A) to his friend's Current Account (Account B) using online banking. The transaction involves the following steps: - Check whether Account A has sufficient balance. - Debit ₹50,000 from Account A. - Credit ₹50,000 to Account B. - Record the transaction in the transaction history table. - Commit the transaction. However, during processing, the system crashes after debiting Account A but before crediting Account B. - Which ACID property ensures that either both debit and credit occur together or neither occurs? Explain how it applies in this scenario. - After system recovery, what should be the correct balances of Account A and Account B according to ACID principles? Justify your answer. - Suppose another user tries to check Account A's balance while the transfer is still in progress. Which ACID property controls this situation? Explain how it prevents inconsistent data visibility. - If the transaction was successfully completed and committed before the crash, which ACID property ensures that the changes are not lost after system restart? Explain. - What potential problems could occur in this banking system if ACID properties were not properly implemented? Provide at least three possible issues based on the scenario.	5	CO3 +CO4