DBMS Practical Exam

Total Marks: 100

Question 1: Database Design (40 Marks)

You are required to design a database schema for a university management system. The system should manage information about students, courses, and enrollment. Consider the following requirements:

1. Each student has a unique student ID, name, date of birth, and address.
2. Each course has a unique course code, title, and credit hours.
3. Students can enroll in multiple courses, and each course can have multiple students enrolled.
4. Each enrollment should include the student's ID, course code, and enrollment date.

Your task: a) Draw an Entity-Relationship (ER) diagram representing the relationships between the entities. b) Convert the ER diagram into a set of normalized tables (at least 3NF) with appropriate primary and foreign keys. c) Provide the SQL commands to create these tables in a relational database management system of your choice.

Question 2: SQL Queries (30 Marks)

Consider the following relational schema for a bookstore:

```
scssCopy code
Books(ISBN, Title, Author, Price, Genre)
Orders(OrderID, CustomerID, ISBN, Quantity, OrderDate)
Customers(CustomerID, Name, Email, Phone)
```

Write SQL queries to perform the following tasks:

a) Retrieve the titles of all books priced over $50. b) List the names of customers who have placed orders in the last month. c) Calculate the total revenue generated from book sales.

Question 3: Database Administration (30 Marks)

You are the database administrator for a company's database system. The database server is experiencing performance issues, and you suspect that poorly optimized queries are the cause. Describe the steps you would take to optimize the database performance, considering both hardware and software aspects. Provide specific techniques or tools you would use to identify and resolve performance bottlenecks.