**Bachelor of Computer Applications (BCA)**

Subject: Database Management Systems  
Time: 3 Hours  
Max Marks: 100

Instructions:

1. All questions are compulsory.
2. Answer the questions as directed.
3. Use diagrams wherever necessary.

Section A: Short Answer Questions

*(Each question carries 5 marks)*

1. Define a database and explain its key characteristics.
2. What are the different types of SQL commands? Briefly explain with examples.
3. Explain the concept of a composite key. Provide an example.
4. Differentiate between DDL and DML commands.
5. What is data redundancy? How does a DBMS help to eliminate redundancy?

Section B: Long Answer Questions

*(Each question carries 10 marks)*

1. Discuss the advantages and disadvantages of using DBMS over a traditional file system.
2. Write an SQL query to:
   * Create a table to store customer details (fields: Customer ID, Name, Phone, and Address).
   * Insert data into the table.
   * Retrieve the names of customers from a specific city.
3. Explain the difference between clustering and non-clustering indexes. Why are indexes important in database design?
4. Define functional dependency. Explain how functional dependencies are used in the process of normalization with an example.
5. Draw an ER diagram for an online shopping system. Include entities such as Customer, Order, Product, and Payment. Explain the relationships between them.

Section C: Case Study

*(Each question carries 15 marks)*

1. A university wants to store information about its students, courses, and the instructors teaching those courses. Design a relational database schema for this system. Define the primary and foreign keys for each table.
2. A hospital management system requires a database to track patients, doctors, and appointments.

* Create a schema for the system with at least three tables.
* Write SQL queries to retrieve the list of appointments for a specific doctor and the details of patients who visited within a specific date range.