

Exam.	Back		
Level	BE	Full Marks	80
Programme	BCT	Pass Marks	32
Year / Part	III / II	Time	3 hrs.

Subject: - Database Management System (CT 652)

- ✓ Candidates are required to give their answers in their own words as far as practicable.
- ✓ Attempt **All** questions.
- ✓ The figures in the margin indicate **Full Marks**.
- ✓ Assume suitable data if necessary.

1. What do you mean by Schema and Instances? Briefly explain the different level of data abstraction. [2+3]

2. Draw an ER diagram for the mini-case “Procurement department of an Organization (ABC) keeps track of all the items such as Furniture and equipment in the offices. There are several buildings of the ABC and each one is given a different name to identify it. Each item is assigned a unique ID when it is purchased. This ID is used to keep track of the item, which is assigned to a room within a building. Each room within a building is assigned to a department”. Document all assumptions that you make about the mapping constraints. [8]

3. Consider the following relational database model:
 - Hotel (Hotel_No, Name, Address)
 - Room (Room_No, Hotel_No, Type, Price)
 - Booking (Hotel_No, Guest_No, Date_From,, Date_To, Room_No)
 - Guest (Guest_No, Name, Address)
 Write SQL statement for the following:
 - a) List all the guests who have booked rooms at the Everest Hotel.
 - b) Create a view to expose only the Hotel_No, Guest_No, Room_No. and price of the room of all booked rooms.
 - c) Find total cost of all the deluxe room of Everest Hotel after offering 5% discount.
 - d) Identify the Hotel name which has the highest total guests. [4×2]

4. For the relational database model given in the Question No. 3. Write relational algebraic expression for the following:
 - a) List the name Hotels in Kathmandu.
 - b) List the Name of Hotels and their all available types of room with price.
 - c) List all the guest name who have booked deluxe room of Everest Hotel.
 - d) List total number of rooms booked (type wise) of the Everest Hotel. [4×2]

5. Suppose that we decompose the schema $R = (A, B, C)$ into $R_1 = (A, B)$, $R_2 = (A, C)$. Show that this decomposition is a lossless join decomposition and not dependency preserving if the $F = \{A \rightarrow B, B \rightarrow C\}$ [2+2]

6. Briefly explain 1NF, 2NF, 3NF and BCNF with suitable illustrations. [2+2+2+2]

7. Explain the process how query is evaluated in RDBMS system. How are equivalence rules for relation algebra helpful for query optimization? Explain with example. [4+4]

8. What do you mean by ordered index and hash index? Explain limitation of static hashing. How extendable hashing overcome such limitation? [3+2+2]

9. What are possible transaction states? Briefly explain any two dead lock handling mechanism with suitable examples. [3+5]

10. Write the different types of failures that may occur in DBMS. Differentiate between shadow paging and log-based recovery. [4+4]

11. Write short notes on: [2×4]
 - a) Data Warehouse and its components
 - b) Distributed Database