Duration: 3hrs **[Max Marks:80]**

N.B. : (1) Question No 1 is Compulsory.
(2) Attempt any three questions out of the remaining five.
(3) All questions carry equal marks.
(4) Assume suitable data, if required and state it clearly.

1 Attempt any FOUR **[20]**

a Justify the need of DBMS in Railways and Airline systems

b List all functional dependencies satisfied by the given relation.

A	B	C
A1	B1	C1
A1	B2	C1
A2	B2	C1
A2	B2	C1

c What are different integrity constraints? Explain each with example.

d Draw and explain the Transaction state diagram.

e Describe Unary operations in relational algebra.

2 a Construct an ER diagram for College Library Management with following requirements **[10]**

- Library needs to store details of book like name, isbn, author name, publications.
- Details of Publishers as id, name, address
- Student details
- Issue details like issuedate, studentid, bookname

b Explain roles and responsibilities of database administrator. **[10]**

3 a Consider the following schema and write SQL query for given statements. **[10]**

Client_master (clientno, name, address, city, pincode, state, baldue)

Product_master (productno, name, profitpercent, unitmeasure, sellprice, costprice)

Salesman_master (Salesmanno, name, address, city, pincode, state, salary, remarks)

1) List all the clients who are located in Mumba

2) Delete all salesmen from salesman_master whose salaries are equal to Rs.3500.

3) Count the number of products having cost price is less than or equal to 500.

4) Calculate the average, minimum and maximum sell price of product.

5) List average salesman salary in each city.

b Draw and Explain three tier database architecture in detail. **[10]**

4 a Explain DDL and DML commands with suitable examples. **[10]**

b Explain types of integrity constraints with example. **[10]**

5 a What are three data anomalies? Explain how it can be overcome by using normalization. **[10]**

b What is serializability? Describe conflict and view serializability. **[10]**

6 a Explain properties of transactions in detail. Give appropriate example for each property. **[10]**

b Consider the following relation for published books **[10]**

Book (Book_Title, Author_name, Book_type, List_Price, Author_affil, Publisher)

Author_affil refers to affiliation of author.

Suppose the following dependency exist:

Book_Title ⟶ Publisher, Book_Type,

Book_Type ⟶ List_Price,

Author_name ⟶ Author_affil

Apply normalization until you cannot decompose the relations further. State the reason behind each decomposition.

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