

Time: 3 hours

Max. Marks: 80

- N.B.:** 1) Question No.1 is compulsory.  
 2) Attempt any **THREE** questions out of remaining **FIVE** questions.  
 3) **Figures** to the **right** indicates **full** marks.  
 4) Assume suitable data if **necessary**.

**Q1 Attempt any four**

**20**

- A** Explain in brief the database system architecture with block diagram.  
**B** Explain three levels of data abstraction. Distinguish between Physical Independence and logical data independence. Which is more difficult to achieve?  
**C** What are the advantages of DBMS over file System?  
**D** State the difference between Relational Algebra and Relational Calculus  
**E** Explain DDL, DML and DCL Commands in SQL with its example  
**F** Describe conflict and view serializability

**Q.2**

- A** Construct ER diagram and convert into relational model for Airline reservation database. **10**  
**B** Explain two phase locking protocol in detail. **10**

**Q.3**

- A** Consider the Following relation: **10**

| ID | NAME    | AGE | SALARY |
|----|---------|-----|--------|
| 1  | Atharva | 25  | 25000  |
| 2  | Suvarna | 37  | 16000  |
| 3  | Asha    | 32  | 35000  |
| 4  | Sayali  | 43  | 42500  |

- Write a query to display names of person containing letters 'S'.
- Write a query to list number of persons with age > 28.
- Write a query to list person drawing Maximum salary.
- Find the avg of salary.
- Write a query to insert new values in the given relation.

- B** Define Normalization. Explain 1NF,2NF,3NF,4NF,5NF with example **10**

**Q.4**

- A** Consider Bank Database **10**  
 Branch (branch name, branch city, assets)  
 Customer (customer name, customer street, customer city)  
 Loan (loan number, branch name, amount)  
 Borrower (customer name, loan number)

Account (account number, branch name, balance)

Depositor (customer name, account number)

Write the following queries in SQL

- (a) Find all customers of the bank who have an account but not a loan.
- (b) Find the names of all branches with customers who have an account in the bank and who live in "Harrison".
- (c) Delete the record of all accounts with balances below the average at the bank.
- (d) Find out the total sums of all loan amounts in the bank.
- (e) Find the names of all branches where the average account balance is more than \$1,200

**B** Analyze the concept of specialization and generalization? What are the different types of constraints involved in specialization? Distinguish between Total and partial participation and between Disjoint and Overlapping specialization. **10**

**Q.5**

**A** Explain and solve the following relational algebra operation with example **10**  
A Project Operator B. Select Operator C. Joins Operator D. Set Operator  
E. Rename Operator

**B** Illustrate problems of concurrency control with example. **10**

**Q.6 Attempt any two of following** **20**

- A** Explain Codd's Rule in Detail
- B** Explain Database Recovery Management
- C** Explain Data Models with example.