(3 Hours)   **[Total Marks 80]**

   i.   **Q. 1. is Compulsory.**
   ii.   **Attempt any three from the remaining.**
   iii.   **Assume suitable data.**

Q 1

a	Explain Data Independence	**5**
b	Explain Recursive queries and Nested queries	**5**
c	What are different Keys in ER diagram?	**5**
d	Explain Join Operations in relational algebra	**5**

Q 2

a	Explain different indexing types in database management system	**10**
b	Explain need of Normalisation along with all the normal forms	**10**

Q 3

a   Consider the following employee database.   **10**
- **Employee(empname, street, city, date_of_joining)**
- **Works(empname, company_name, salary)**
- **Company(company_name, city)**
- **Manages(empname, manager_name)**

Write SQL queries for the following statements:
1. Modify the database so that employee "Amruta" now leaves in "Konkan"
2. Find number of employees in each city with date_of_joining as "01-Aug-2017"
3. list name of companies starting with letter "A"
4. Display empname , manager_name , street , city only for employees having manager

b   Explain in detail different database users   **10**

Q 4 **a**   Construct a dependency diagram of relation R and normalize it up to the   **10**
BCNF Normal form
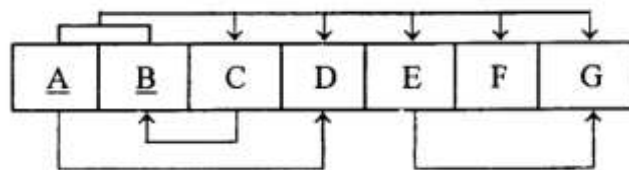
b   Explain different types of operators in relational algebra   **10**

Q 5

a	Explain the difference between stored procedure and functions in SQL	**10**
b	Draw EER diagram for Library Management System showing aggregation.	**10**

Q 6   **Write a short note on:**

a	Specialization and Generalization	**5**
b	DCL commands	**5**
c	Cursors and its types	**5**
d	Hashing techniques	**5**