

**Duration: 3hrs**

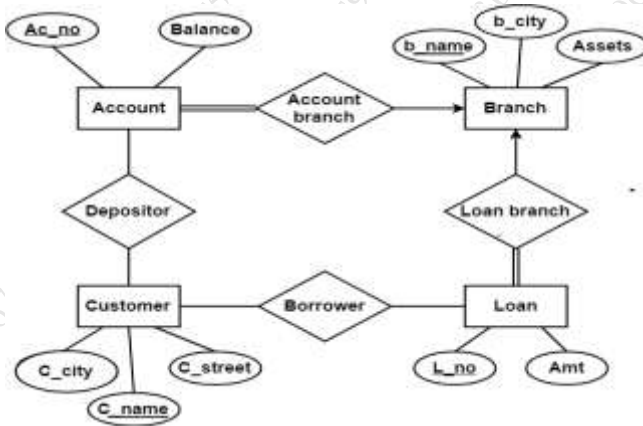
**[Max Marks:80]**

- 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 Identify different users of database management system  
 b Convert following E-R diagram to relational schema



- c Explain all types of integrity constraints with an examples?  
 d List all functional dependencies satisfied by the relation.

X	Y	Z
X1	Y1	Z1
X1	Y2	Z1
X2	Y2	Z1
X2	Y2	Z1

- e Discuss Log based recovery with an example
- 2 a Discuss three layer schema architecture with suitable diagram. What is Data Independence? Explain types of data independence. **[10]**
- b What is deadlock? Give deadlock prevention methods with suitable example **[10]**
- 3 a Construct an ER diagram and convert it into a relational model for a company which has several employees working on different types of Projects. Several employees are working for one department, every department has a manager. Several employees are supervised by one employee. Employees have zero or more dependents **[10]**

- b Explain the following Relational Algebra operations with suitable example. [10]
- 1) Generalized Project
  - 2) Select
  - 3) Union
  - 4) Rename
  - 5) Natural Join
- 4 a Write SQL queries for the given database [10]
- Book(book\_id, title,author, cost)  
Store(store\_no, city, state, inventory\_val)  
Stock(store\_no, book\_id,quantity)
- (i)Modify the cost of DBMS books by 10%
  - (ii)Find the total number of books in Mumbai stores
  - (iii)Find title of all books whose title contains the word 'System'
  - (iv)Find title of the most expensive book
  - (v)Add a new record in Book(Assume values as per requirement)
- b Why there is need of normalization? Explain 1NF, 2NF, 3NF and BCNF with example. [10]
- 5 a Describe ACID properties with examples [10]
- b Give example of serial schedule and equivalent to serial schedule with respect to conflict serializability. Discuss conflict serializability with example [10]
- 6 Write short note on the following (Any four) [20]
- a Conversion of Specialization to relational schema with suitable example [05]
  - b Types of attributes [05]
  - c 2PL concurrency control protocol [05]
  - d Triggers [05]
  - e Lossless decomposition [05]
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