

(3 Hours)

Total marks: 80

**Note:**

1. Q1 is compulsory
2. Attempt any four from remaining six questions

Q1: (a) Draw an E R Diagram for the following,

“Saboo car rental services” is a car rental showroom, who want to automate their business.

1. They offer different types of cars on rent as small car, SUV, MUV
2. Each types of car has the maximum seating available and the tariff per kilometer.
3. The management wants the system to show availability of the number of cars of each type for serving the inquiry.
4. The system should have a provision for booking the car. Before the booking is made, the customer needs to provide personal information and driving license details.
5. Booking is typically stored as booking date, date of rent, duration in hours and type of vehicle.
6. Once the booking is done a unique booking number is provided to the customer for their reference which they need to produce at the time they come to collect the car.
7. A new transaction record is created for each booking after the car is returned, specifying the kilometers used and the amount to be paid date of payment.

(b) Write schema definition of above E-R diagram and Normalize up to 3NF 10

Q2: (a) Briefly explain architecture of DBMS. 8

(b) Define deadlock? Describe deadlock prevention techniques. 7

Q3: (a) Explain Tree based indexing and Hash based indexing. 8

(b) Explain Bell-La Padula model for security implementation. 7

Q4: (a) Define Decomposition? Explain Lossless and Dependency preserving decomposition. 8

(b) Briefly explain working of Query Optimizer. 7

Q5: (a) Explain Codd's Rule for designing Relational Database. 8

(b) Define Locking Protocol, Explain Strict Two phase Locking protocol 7

Q6: (a) Differentiate the following. 8

- i) Hierarchical and Network model
- ii) DBMS Vs RDBMS.

(b) Explain in brief Granularity in Locks. 7

Q7: Write short notes on any three of the following: 15

- a. Shadow paging
- b. Serializability
- c. Types of databases
- d. Crash recovery using checkpoint

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