

Code: 20IT3401

II B.Tech - II Semester – Regular Examinations – JULY 2022**DATABASE MANAGEMENT SYSTEM
(INFORMATION TECHNOLOGY)**

Duration: 3 hours

Max. Marks: 70

Note: 1. This paper contains questions from 5 units of Syllabus. Each unit carries 14 marks and have an internal choice of Questions.
2. All parts of Question must be answered in one place.

UNIT – I

1. a) Discuss the main characteristics of the database approach and how it differs from traditional file systems. 7 M
- b) What is the difference between logical data independence and physical data independence? Which one is harder to achieve? Why? 7 M

OR

2. a) Discuss the differences between centralized and client server architecture for DBMS. 7 M
- b) Discuss the main categories of data models. What are the basic differences among the relational model, the object model, and the hierarchical model? 7 M

UNIT – II

3. a) Consider the bank database, where the primary keys are underlined. Construct the following SQL queries for this relational database.

branch(branch_name, branch_city, assets)

customer (ID, customer_name, customer_street, customer_city)

loan (loan_number, branch_name, amount)

borrower (ID, loan_number)

account (account_number, branch_name, balance)

depositor (ID, account_number)

- i) Find the ID of each customer of the bank who has an account but not a loan.
 - ii) Find the ID of each customer who lives on the same street and in the same city as customer '12345'.
 - iii) Find the name of each branch that has at least one customer who has an account in the bank and who lives in "Harrison". 7 M
- b) How can the key and foreign key constraints be enforced by the DBMS? Is the enforcement technique you suggest difficult to implement? Can the constraint checks be executed efficiently when updates are applied to the database? 7 M

OR

4. a) Consider the following relations for a database that keeps track of automobile sales in a car dealership (OPTION refers to some optional equipment installed on an automobile):
- CAR(Serial_no, Model, Manufacturer, Price)
OPTION(Serial_no, Option_name, Price)
SALE(Salesperson_id, Serial_no, Date, Sale_price)
SALESPERSON(Salesperson_id, Name, Phone)
- First, specify the foreign keys for this schema, stating any assumptions you make. Next, populate the relations with a few sample tuples, and then give an example of an insertion in the SALE and SALESPERSON relations that violates the referential integrity constraints and of another insertion that does not. 7 M
- b) Discuss how each of the following constructs is used in SQL, and discuss the various options for each construct. Specify what each construct is useful for.
- i) Triggers.
 - ii) Assertions and how they differ from triggers.
 - iii) Views and their updatability. 7 M

UNIT-III

5. a) Can an identifying relationship of a weak entity type be of a degree greater than two? Give examples to illustrate your answer. 7 M
- b) Describe the two alternatives for specifying structural constraints on relationship types. What are the advantages and disadvantages of each? 7 M

OR

6. a) What is meant by a recursive relationship type? Give some examples of recursive relationship types. 7 M
- b) Construct an E-R diagram for a car insurance company whose customers own one or more cars each. Each car has associated with it zero to any number of recorded accidents. Each insurance policy covers one or more cars and has one or more premium payments associated with it. Each payment is for a particular period of time, and has an associated due date, and the date when the payment was received. 7 M

UNIT – IV

7. a) Consider the following relation:
CAR_SALE(Car#, Date_sold, Salesperson#, Commission%, Discount_amt)
Assume that a car may be sold by multiple salespeople, and hence {Car#, Salesperson#} is the primary key.
Additional dependencies are
Date_sold → Discount_amt and
Salesperson# → Commission%
Based on the given primary key, is this relation in 1NF, 2NF, or 3NF? Why or why not? How would you successively normalize it completely? 7 M
- b) Define fourth normal form. When is it violated? When is it typically applicable? 7 M

OR

8. a) Consider the following relation:
 TRIP (Trip_id, Start_date, Cities_visited, Cards_used)
 This relation refers to business trips made by company salespeople. Suppose the TRIP has a single Start_date but involves many Cities and salespeople may use multiple credit cards on the trip. Make up a mock-up population of the table.
- i) Discuss what FDs and/or MVDs exist in this relation. 7 M
 ii) Show how you will go about normalizing the relation. 7 M
- b) Why 5NF is also called project-join normal form (PJNF)? 7 M

UNIT – V

9. a) Discuss how serializability is used to enforce concurrency control in a database system. Why is serializability sometimes considered too restrictive as a measure of correctness for schedules? 7 M
- b) Discuss the problems of deadlock and starvation, and the different approaches to dealing with these problems. 7 M

OR

10. a) Describe the four levels of isolation in SQL. Also discuss the concept of snapshot isolation and its effect on the phantom record problem. 7 M
- b) What is meant by transaction rollback? What is meant by cascading rollback? Why do practical recovery methods use protocols that do not permit cascading rollback? Which recovery techniques do not require any rollback? 7 M