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18CS53

Fifth Semester B.E. Degree Examination, Jan./Feb. 2021

Database Management System

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1. a. Define the following terms :
 - i) Database
 - ii) DBMS catalog
 - iii) Entity
 - iv) Snapshot
 - v) Degree of a relationship. (05 Marks)
- b. Explain types of end-users with suitable examples. (05 Marks)
- c. List and explain advantages of using DBMS approach. (10 Marks)

OR

2. a. Define the following terms
 - i) Cardinality
 - ii) Weak entity
 - iii) Program data independence
 - iv) Total participation
 - v) Value sets. (05 Marks)
- b. Describe three schema architecture. Why do we need mappings between schema levels? (05 Marks)
- c. Explain different types of attributes in ER model with suitable examples for each. (10 Marks)

Module-2

3. a. Explain the entity integrity and referential integrity constraints. Why is each considered important. Give examples. (05 Marks)
- b. Discuss equijoin and natural join with suitable examples using relational algebra notation. (05 Marks)
- c. Given the schema :
 - Passenger (pid, pname, pgender, pcity)
 - Agency (aid, anme, acity)
 - Flight (fid, fdate, time, src, dest)
 - Booking (pid, aid, fid, fdate)
 Give relation algebra expression for the following :
 - i) - Get the complete details of all flights to new Delhi
 - ii) Find only the flight numbers for passenger with paid 123 for flights to Chennai before 06/11/2020
 - iii) Find the passenger names for those who do not have any bookings in any flights
 - iv) Get the details of flights that are scheduled on both dates 01/12/2020 and 02/12/2020 at 16:00 hours
 - v) Find the details of all male passengers who are associated with jet agency. (10 Marks)

OR

- 4 a. Explain the ER to relational mapping algorithm with suitable example for each step. (10 Marks)
- b. Write SQL query for the following database scheme :
- Employee(employee_name, street, city)
 Works (employee_name, company_name, salary)
 Company(company_name, city)
 Manages(employee_name, manager_name)
- i) Find the names, street address, and cities of residence for all employees who work for 'First Bank Corporation' and earn more than \$10,000
- ii) Find the names of all employees in the database who do not work for 'First Bank Corporation'. Assume that all people work for exactly one company
- iii) Find the names of all employees in the database who earn more than every employee of 'Small Bank Corporation'. Assume that all people work for at most one company
- iv) Find the name of the company that has the smallest payroll
- v) Find the names of all employees in the database who live in the same cities and on the same streets as do their managers. (10 Marks)

Module-3

- 5 a. Explain cursors and its properties in embedded SQL with suitable example. (05 Marks)
- b. How are triggers defined in SQL? Explain with example. (05 Marks)
- c. Illustrate insert, delete, update, alter and drop statements in SQL. (10 Marks)

OR

- 6 a. With an example, explain stored procedures In SQL. (05 Marks)
- b. Briefly explain types of JDBC drives. (05 Marks)
- c. Illustrate aggregate functions in SQL. (10 Marks)

Module-4

- 7 a. Explain types of update anomalies with examples. (05 Marks)
- b. Explain Armstrong inference rules. (05 Marks)
- c. What is the need for normalization? Explain 1NF, 2NF and 3NF with examples. (10 Marks)

OR

- 8 a. What is functional dependency? Write an algorithm to find minimal cover for set of functional dependencies. Construct minimal cover m for set of functional dependencies which are : $E : \{B \rightarrow A, D \rightarrow A, AB \rightarrow D\}$ (10 Marks)
- b. Consider the schema $R = ABCD$, subjected to FDs $F = \{A \rightarrow B, B \rightarrow C\}$, and the non-binary partition $D1 = \{ACD, AB, BC\}$. State whether D1 is a lossless decomposition? [give all steps in detail]. (10 Marks)

Module-5

- 9 a. Define transaction. Discuss ACID properties. (05 Marks)
- b. With a neat diagram explain transition diagram of a transaction. (05 Marks)
- c. Why concurrency control and recovery are needed in DBMS? Explain types of problems that may occur when two simple transactions run concurrently. (10 Marks)

OR

- 10 a. When deadlock and starvation problem occur? Explain how these problems can be resolved. (10 Marks)
- b. Briefly discuss the two-phase locking techniques for concurrency control. (10 Marks)
