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 that 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 ananalies 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)**

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