Fifth Semester B.E. Degree Examination, Dec.2023/Jan.2024
Database Management Systems

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions, selecting atleast TWO questions from each part.*

PART – A

1 a. List the main characteristics of Database approach. How does these differ from traditional file systems? **(08 Marks)**

b. What do you mean by Data Independence? Differentiate the logical and physical data independence concepts. Explain these with a neat three-schema architecture. **(08 Marks)**

c. List the roles and responsibilities of DBA and Database Designers. **(04 Marks)**

2 a. Define the following with an example for each:
i) Entity type   ii) Entity set   iii) Composite attribute
iv) Participation Role   v) Relationship Instance. **(10 Marks)**

b. When is the concept of weak entity used in Data Modeling? Define Partial key. **(04 Marks)**

c. Draw an ER diagram for Hospital Database Application with at least four entities and two relationship types. Assume at least three attributes for each entity that are relevant. **(06 Marks)**

3 a. Discuss the characteristics of relations that make them different from ordinary tables and files. **(05 Marks)**

b. Define i) Key   ii) Super key   iii) Foreign key   iv) Entity Integrity
v) Union Compatibility. **(05 Marks)**

c. Consider the following relations for a database that keeps track of business trips of salespersons in a sales office:
    Salesperson (SSN, Name, Start_year, DNo)
    Trip (SSN, From_City, To_City, Dep_Date, Ret_Date, Trip_ID)
    Expense (Trip_ID, AccountNo, Amount)
Specify the foreign keys for the above the above schema and write the queries in Relational Algebra for the following:
i) Give the details of Trips that exceeded Rs.2000 in expenses.
ii) Print the SSN and Name of salesman who took trip to 'Hyderabad'
iii) Print the total trip expenses incurred by the salesman with SSN = '190-23'. **(10 Marks)**

4 a. List and explain the Datatypes and constraints that are used during table creation in SQL. **(08 Marks)**

b. Give the complete syntax of SELECT statement in SQL. **(04 Marks)**

c. Consider the following relations for a database:
    Project (PNo, PName, Chief_architect)
    Employee (EmpNo, EmpName, Addr)
    ASSIGNED_TO (ProjNo, EmpNo)
Write the queries in SQL for the following :
i) Get the details of Employees working on project "CS51".
ii) Obtain the Name and address of the employees working on "DBMS" project.
iii) Find the employee number of employees who work on all the projects that employee 105 works on.
iv) Get the employee number of employees who work on all projects. **(08 Marks)**

PART – B

5 a. What are views in SQL? How is view created and dropped? What problems are associated with updating views?   (08 Marks)

   b. Explain : i) Triggers   ii) Assertion   iii) Embedded SQL   iv) Database programming.   (12 Marks)

6 a. What are the Informal guidelines to be followed for a good relational schema design? Explain.   (06 Marks)

   b. Define 1NF, 2NF and 3NF with example for each.   (06 Marks)

   c. What do you mean by closure of attribute? Write the algorithm to find the same and what is the use of it?   (08 Marks)

7 a. List the properties of Relational Decomposition.   (04 Marks)

   b. Define : i) Multivalued Dependency   ii) 4NF   (04 Marks)

   c. Explain the 5NF with an example.   (06 Marks)

   d. Consider R = (A, B, C, D, E, F) with set of
      Functional Dependencies = {AB $\rightarrow$ C, B $\rightarrow$ E, A $\rightarrow$ DF}
      Check whether decomposition is lossless.
(06 Marks)

8 a. What is transaction? Explain the ACID properties of a Transaction.   (06 Marks)

   b. Discuss the concurrency control techniques.   (10 Marks)

   c. Why Recovery is needed? What are the Approaches for Recovery?   (04 Marks)

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