22MCA2C5L

MCA II Semester (NEP) Degree Examination, Nov-2023

MATER OF COMPUTER APPLICATION

Paper: Database Management Systems

Hours: 03   **Max Marks: 70**

Answer any Five of the following questions with Question No. 1 is Compulsory.

1. a) Differentiate between File System &DBMS.   **7**

   b) Describe four basic operations performed on relational database model with an example   **7**
       Company database containing the attributes Cust_ID, Cust_Name and Status.

2. a) Briefly explain the two main types of relational calculus, and solve the queries.   **7**

         i. Retrieve the names of students whose GPA is Greater than 3.5.
         ii. Retrieve the names of students who are 20 years old.

Std ID	Name	Age	GPA
1.	Alice	20	3.7
2.	Bob	22	3.2
3.	Charlie	21	3.9
4.	David	19	3.5
5.	Emma	20	3.1

   b) Write SQL syntax for creating table EMP(EMPNO, ENAME, SALARY, JDATE, DIS and   **7**
       for inserting two inserting two rows in table, delete one row from table, update salary and
       view whole table.

3. a) Describe the steps to calculate closure of functional dependency, and determine the   **7**
       Candidate keys for the relation R (ABCDE) for the functional dependency
       FD: { A $\longrightarrow$ B, BC $\longrightarrow$ D, E $\longrightarrow$ C, $\longrightarrow$ A}

   b) Describe the properties of Decomposition for the Employee table given below: **7**

Eid	Ename	Age	City	Salary	Deptid	Dept Name
E001	Abhi	29	Pune	20000	D001	Finance
E002	Pooja	30	Pune	30000	D002	Production
E003	Lakshman	25	Mumbai	5000	D003	Sales
E004	Sachin	24	Mumbai	4000	D004	Marketing
E005	Vamshi	32	Bangalore	25000	D005	Human Resource

4. a) Describe the basic principles of the Two-Phase Locking protocol and how it ensures serializability of transactions. 　7

T1	T2
Lock S (A)	
	Lock S (A)
Lock X (B)	
Unlock (A)	
	Lock X (D)
Unlock (B)	
	Unlock (A)
	Unlock (D)

b) Suppose you have multiple transactions executing concurrently. How would you determine if the resulting schedule is an Irrecoverable schedule and also Read Write Conflict? 　7

5. a) Evaluate the efficiency of different join algorithms, such as Nested Loop Join, Has Join, and Sort- Merge Join. 　7

b) Illustrate the steps involved in modifying a sorting algorithm for projection with duplicate elimination, and how do these modifications impact the overall I/O cost. 　7

6. a) Create a SQL trigger that automatically updates a 'last_modified' timestamp when a row in a specific table is updated. 　7

b) List the properties of Functional Dependency. 　7

7. a) What is the Timestamp Ordering Protocol (TSO)? Assume basic timestamp ordering protocol and that time starts from 1, each operation takes unit amount of time. The time table of timestamp is given below: 　7

Time of Transaction	T1(TS=100)	T2(TS=200)	T3(TS=300)
Time 1	R (A)		
Time 2		R (B)	
Time 3	W (C)		
Time 4			R (B)
Time 5	R (C)		
Time 6		W (B)	
Time 7			W (A)

Find RTS (A), WTS (A), RTS (B), WTS (B), RTS (C) and WTS (C) at the end.

b) Define Query Processing with an example. 　7

8. Write a short note on the following: 　5+5+4
   a. Embedded SQL.
   b. Types of Functional Dependency.
   c. Wait Die Scheme.

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