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Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

MCA

SEM: II - CARRY OVER THEORY EXAMINATION - SEPTEMBER 2022

Subject: Database Management System

Time: 3 Hours Max. Marks: 100

General Instructions:

1. The question paper comprises three sections, A, B, and C. You are expected to answer them as directed.
2. Section A - Question No- 1 is 1 marker & Question No- 2 carries 2 marks each.
3. Section B - Question No-3 is based on external choice carrying 6 marks each.
4. Section C - Questions No. 4-8 are within unit choice questions carrying 10 marks each.
5. No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.

SECTION A 20

1. Attempt all parts:-

1-a. In general, a file is basically a collection of all related_____. (CO1) 1

(a) Rows & Columns

(b) Fields

(c) Database

(d) Records

1-b. Double ellipses represent _____.(CO1) 1

(a) Derived attributes

(b) MultiValued Attributes

(c) total participation of an entity in a relationship set

(d) Weak entity type

1-c. Which of the following is used to denote the selection operation in relational algebra?(CO2) 1

(a) Pi (Greek)

(b) Sigma (Greek)

(c) Lambda (Greek)

(d) Omega (Greek)

1-d. If two relations R and S are joined, then the non-matching tuples of both R and S are ignored in_____. (CO2) 1

(a) left outer join

(b) right outer join

(c) full outer join

(d) inner join

1-e. A functional dependency is a relationship between or among_____. (CO3) 1

(a) Entities

(b) Rows

(c) Attributes

(d) Tables

1-f. The minimal set of superkey is also called (CO3) 1

(a) Primary Key

(b) Secondary key

(c) Foreign key

(d) Candidate key

1-g. A transaction that has not been completed successfully is called as _____. (CO4) 1

(a) Compensating transaction

(b) Aborted transaction

(c) Active transaction

(d) Partially committed transaction

1-h. Property of transactions is required by concurrent transactions: (CO4) 1

(a) Atomicity

(b) Durability

(c) Isolation

(d) All of the mentioned

1-i. Which of the following are introduced to reduce the overheads caused by the log-based recovery? (CO5) 1

(a) Checkpoints

(b) Indices

(c) Deadlocks

(d) Locks

1-j. All lock information is managed by a _____ which is responsible for assigning and policing the locks used by the transactions.(CO5) 1

(a) Scheduler

(b) DBMS

(c) Lock manager

(d) Lock Integrator

2. Attempt all parts:-

2.a. What are the disadvantages of file processing system? (CO1) 2

2.b. Define "key" the in Relational Model? (CO2) 2

2.c. Define Functional dependency with Example. (CO3) 2

2.d. Define a schedule.(CO4) 2

2.e. Differentiate between Two phase locking and Rigorous two-phase locking.(CO5) 2

SECTION B 30

3. Answer any five of the following:-

3.a Explain the three levels of data abstraction. (CO1) 6

3.b Explain the total and partial constraints with the help of an example.(CO1) 6

3.d Define Union Compatibility with suitable example.(CO2) 6

3.c Explain Cartesian Product with the help of an example and explain how it is different from Equi-join.(CO2) 6

3.e. Define lossless join decomposition.(CO3) 6

3.f. Explain the cascadeless schedule with the help of an example.(CO4) 6

3.g. Diffentiate between immediate database modification and deferred database modification with examples.(CO5) 6

SECTION C 50

4. Answer any one of the following:-

4.a Draw an ER diagram and clearly mention the cardinality ratio , relationship among the entities with all their attributes for a company database needs to store information about employees (identified by ssn, with salary and phone as attributes), departments (identified by dno, with dname and budget as attributes), and children of employees (with name and age as attributes). 10

Employees work in departments, each department is managed by an employee, a child must be identified uniquely by name when the parent (who is an employee; assume that only one

parent works for the company) is known.We are not interested in information about a child once the parent leaves the company. (CO1)

4.b Define database languages. Explain different types of database languages with commands.(CO1) 10

5. Answer any one of the following:-

5 Consider the following relation schema: 10

SUPPLIER(sid: integer, sname: string, address: string)

PARTS(pid: integer, pname: string, color: string)

CATALOG(sid: integer, pid: integer, cost: real)

Write the relational algebra queries for following statements.

1) Find the sids of suppliers who supply some red part and some green part
2) Find the sids of suppliers who supply every red part.
3) Find the sids of suppliers who supply every red part or supply every green part.
4) Find the pids of parts that are supplied by at least two different supplier.
5) Find the name of suppliers who supply green parts and live in 'Greater Noida'. (CO2)

5 Define joins. Explain different types of joins with example.(CO2) 10

6. Answer any one of the following:-

6.a Consider a relation R (A, B, C, D, E) with the following dependencies: 10

AB→C, CD→E, DE→ B.

Find the super key and candidate key for the relation R.(CO3)

6.b Explain the 1NF,2NF and 3NF with suitable example. Why all BCNF relations are in 3NF but the vice-versa not true. Justify the statement. (CO3) 10

7. Answer any one of the following:-

7 Differentiate between conflict serializability and view serializability with the help of an example. (CO4) 10

7 Explain the deadlock detection and recovery with suitable example. (CO4) 10

8. Answer any one of the following:-

8 Discuss and Elaborate Time Stamp based protocol. Discuss its features.(CO5) 10

8 Discuss the Locking techniques for concurrency control.(CO5) 10