**Roll No.** | | | | | | | | | | | | | **Total No. of Pages : 02**

**Total No. of Questions : 09**

**MCA (2015 Batch) (Sem.–2)**

# RELATIONAL DATABASE MANAGEMENT SYSTEM

**Subject Code : MCA-202**

**Paper ID : [72877]**

**Time : 3 Hrs.** **Max. Marks : 60**

**INSTRUCTIONS TO CANDIDATES :**

1. **SECTIONS-A, B, C & D contains TWO questions each carrying TEN marks each and students has to attempt any ONE question from each SECTION.**
2. **SECTION-E is COMPULSORY consisting of TEN questions carrying TWENTY marks in all.**
3. Use of non-programmable **scientific calculator** is allowed.

## SECTION-A

1 a) What is Data Independence? List its types.

b) With example explain referential integrity constraint with an delete cascade.

2 a) What is client server architecture? Give suitable example, compare network and hierarchical model.

b) Draw an ER diagram for Institute management system.

## SECTION B

3. a) List and explain the steps for query processing.

b) Normalize the following database up to 3NF STUDENT (stud-no, stud-name, studadd, course-no, course-title, teacher-name, marks-obtained

4. Define the five basic operators of relational algebra with an example each.

## SECTION C

5. Suppose we wish to implement a transaction processing system that maintains ACID properties even in the presence of crashes. In event of a crash, any information stored on disk can be retrieved, but any data stored in memory will be lost.

Briefly describe one serious shortcoming of each of the following implementations :

a) The database is updated on disk with each transaction

b) The database is kept in memory and on disk, with the copy on disk updated every 50 transactions.

6. Provide an overview of the database development process. In your answer, discuss the DB development process, how database development overlaps and interacts with application software development, and the relationship between application systems and database systems in terms of the purpose for each type of system.

## SECTION D

7. In distributed system where messages are asynchronous and failures can be Byzantine, we have to use at least $n = 3f + 1$ replicas in total to tolerate f faulty replicas. Show that this bound is tight, i.e., that $n \geq 3f + 1$ must hold in order for the system to work properly. To approach this problem, consider this scenario : a client sends the same command to each of n servers and then waits for the servers to execute the command and send back the result. Ideally, the client should receive n matching results, but remember that f servers may be malicious. Additionally, messages are asynchronous, so they can be delayed for an indefinite amount of time. Show that $n \geq 3f + 1$ must hold for the client to always be able to identify the correct result.

8. Discuss the concept of data warehousing and relate the data warehouse to databases designed to support operational data requirements. In your answer, discuss the nature of organizational decision making, the role of databases in supporting decision making, the structure of data warehouses (i.e., contrast a data warehouse to a traditional database), and the relationship of operational databases, application systems, decision making systems, and data warehouses.

## SECTION E

9. **Define the following terms** :

    1. Transaction Transparency
    2. DSS
    3. Multivalued attribute
    4. Relationship instance
    5. In the relational modes how is cardinality termed as?
    6. OLAP
    7. DDBMS
    8. Database Recovery Management
    9. Times tamping Method
    10. OOD and ORD Comparison