

Roll No.

--	--	--	--	--	--	--	--	--	--	--	--

Total No. of Pages: 03

Total No. of Questions: 09

MCA (2015 & Onwards) (Sem. – 2)
RELATIONAL DATABASE MANAGEMENT SYSTEM

M Code: 72877

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 and students have 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. An orchestra database consists of the following relations:

CONDUCTS (conductor, composition)

REQUIRES (composition, Instrument)

PLAYS (Player, Instrument)

Give the relational calculus queries for the following:

- a) List the compositions and the players.
 - b) List the compositions which require the 'violin' and the 'Guitar'.
2. The process used to model data in database design is fundamental to developing a useful and robust database. Please show that you are able to perform ER Modeling by developing a model for the following scenario. You may fill in the details about the assumptions you are making for this case about relationships, cardinality, and participation.

SECTION B

3.
 - a) What is rollback operation and why it is required?
 - b) Explain how timestamp based concurrency protocol schemes are implemented.
4. Discuss the correspondence between the E-R model construct and the relational model construct. Show how each E-R model construct can be mapped to the relational model using the suitable example.

SECTION C

5.
 - a) In eager master replication, when the master fails, why does a group of replicas need to have the majority of nodes in order to elect a primary and continue processing requests?
 - b) What are the differences between eager and lazy replication? Please list differences in the approaches and differences in the properties that result. Discuss master vs group replication if appropriate.
6. Discuss the role of DB management systems in securing organizational data. In answering this question, discuss security from both a conceptual and physical perspective. In other words, discuss the general process of how DBMS enable and facilitate security and also discuss specific SQL procedures that can be used to implement and manage security. In answering this question, you might want to discuss views, user privileges, and procedural controls.

SECTION D

7.
 - a) What is the sequence of operations at the coordinator after it recovers?
 - b) What is the sequence of operations at a subordinate that received the message and replied to it before the coordinator crashed?
8. In the two-phase commit protocol, why do subordinates need to force-write a prepared log record before sending a YES VOTE? To answer this question, use an example failure scenario. Show what happens if a subordinate does NOT force-write the prepared log record, then show what happens if the subordinate does force-write the prepared log record.

SECTION E

Each short question carries 2 marks. Answer each question in around 2-3 lines.

- a) What do you understand by Transaction Properties?
- b) Define: Locking Methods.
- c) Define OOR.
- d) Compare Client/Server vs DBMS architecture.
- e) Compare: Homogenous and Heterogeneous DBMS.
- f) What do you understand by Multivalued Dependencies?
- g) How is access control enforced over a database?
- h) What are the various ways in which a database can be secured?
- i) What do you understand by serializability of schedules?
- j) Classify different kinds of DBMS and discuss one application of each DBMS.