

(Following Paper ID and Roll No. to be filled in your Answer Book)

**PAPER ID : 1408**

Roll No.

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## MCA

THIRD SEMESTER EXAMINATION, 2004-2005

### DATABASE MANAGEMENT SYSTEM

Time : 3 Hours

Total Marks : 100

**Note :** Attempt ALL questions.

1. Attempt *any four* of the following :— (5x4=20)
- Explain the difference between Super Key, Candidate Key and Primary Key.
  - List all the database users. Explain sophisticated and specialized user.
  - Define the following terms :
    - Association
    - Specialization
    - Transaction Manager
    - Query processor
    - Data Independence
  - What do you mean by attribute ? List various types of attributes.
  - Draw E—R diagram for banking enterprise.

2. Attempt *any two* of the following :— (10x2=20)

(a) Consider the following relational database :

Person (SS#, name, address)

Car (License, year, model)

Accident (date, driver, damage\_amount)

Owns (SS#, Licence)

Log (License, date, driver)

Construct the following SQL queries for this relational database :

(i) Find the number of accidents in which the cars belonging to "John Smith" were involved

(ii) Add a new accident record for the Toyota belonging to "John".

(b) Explain trigger and assertion with suitable example. Write the assertion for the following statement :

"Every loan has at least one customer who maintains an account with minimum balance of Rs. 1000 in banking system".

(c) Consider the following query :

Select P. a<sub>1</sub>

from P, r<sub>1</sub>, r<sub>2</sub>

where P.a<sub>1</sub> = r<sub>1</sub>.a<sub>1</sub> or

P.a<sub>1</sub> = r<sub>2</sub>.a<sub>1</sub>

Under what conditions does the preceding query select values of p.a<sub>1</sub> that are either in r<sub>1</sub> or in r<sub>2</sub> ?

3. Attempt *any four* of the following :- (5x4=20)

- (a) Compute the closure of the following set F of functional dependencies for relation scheme.

$R = (A, B, C, D, E)$

$A \rightarrow BC$

$CD \rightarrow E$

$B \rightarrow D$

$E \rightarrow A$

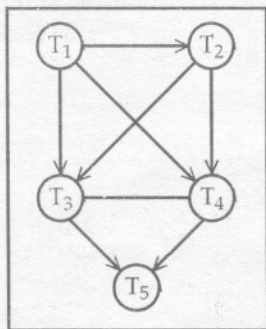
Also list the candidate keys R and compute the canonical cover Fc.

- (b) Explain why 4NF is a normal form more desirable than is BCNF.
- (c) Use the definition of multivalued dependency to argue that each of the following axioms is sound :
- (i) The multivalued augmentation rule
  - (ii) The complementation rule
- (d) Explain the concept of referential integrity and foreign key with suitable example.
- (e) What is data redundancy and which characteristics of the file system can lead to it ?

4. Attempt *any two* of the following :- (10x2=20)

- (a) Describe ACID properties of the transaction. Explain serializability with suitable example.

- (b) Consider the precedence graph in fig. Is the corresponding schedule conflict serializable ? Explain your answer :



- (c) Explain how the following differ :

Fragmentation, replication transparency and location transparency.

5. Answer *any two* of the following :— (10x2=20)

- (a) When a transaction is rolled back under time stamp ordering, it is assigned a new time stamp. Why it cannot simply keep its old time stamp ? In multiple-granularity locking, What is the difference between implicit and explicit locking ?
- (b) What is time stamp ? List all the time stamp based protocols, check whether it is cascadeless and whether it is recoverable.
- (c) Explain the phantom phenomenon. Why may this phenomenon lead to an incorrect concurrent execution despite use of the two phase locking protocol ?

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