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CS-15

MCA (III Year)

Term-End Examination

00825

December, 2010

CS-15 : RELATIONAL DATABASE MANAGEMENT SYSTEM

Time : 3 hours *Maximum Marks : 75*

Note : *Question number 1 is* ***compulsory.*** *Answer* ***any three*** *questions from the rest.*

1. (a) Explain the significance and usage of views in a relational database system, with the help of suitable examples. Explain any four constraints of updating a tuple in a view. 8

(b) Draw the ER diagram and design the database schema for the following. The company K- music has decided to store information in a database about musicians who perform on its musical CD having the following :- 15

(i) Each instrument used in songs recorded at K - Music has a name (ex: guitar etc.) and a musical key (ex- A, B, C)

(ii) Each musician that records at K- music has a Serial number a name, an address and a phone number. Poorly paid musicians often share the same address, and no address has more than one phone.

(iii) Each recorded CD at K-music has a title, a copyright date, a format and an CD identifier.

(iv) Each song recorded at K - music has a title and an author.

(v) Each musician may play several instruments and a given instrument may be played by several musicians.

(vi) Each CD has a number of songs on it, but no song may appear or more than one CD.

(vii) Each song is performed by one more musicians and a musician may perform a number of songs.

(viii) Each CD has exactly one musician who acts as its producer. A musician may produce several albums.

(c) What are various transaction states? Explain each state and state transition with the help of an examples each. 7

2. (a) Consider the following relations : 8

GRADE (Stud_id, subject_id, grade)

SUBJECT (subject_id, S -name, teacher)

(i) Write the relational algebraic expression for the following queries :

- List the student number, subject names and grades of the student whose id is 100.
- List the grades of all the students in the subjects taught by teacher "JOHN".

(ii) Convert the queries above into an optimized query graph.

(b) How is checkpointing information used in the recovery operation following a system crash. ? Explain with the help of an example and diagram. 7

3. (a) What is a timestamp ? How does the system generate timestamps ? Explain the timestamp ordering protocol for concurrency control. 8

(b) List different types of security threats in the context of database systems. Explain any one defence mechanism required to be build into a DBMS against security threats. 4

(c) Why are certain functional dependencies called "trivial functional dependencies" ? Explain. 3

4. Explain the following with the help of an example/diagram , if needed : 15

(a) Generalization in ER diagram

(b) Importance of BCNF

(c) Granularity of locking

(d) Audit trials

(e) Project Join Normal form

5. (a) A university has many colleges, each administered by a Principal. The college has an administrative unit which stores information about teaching staff, programmes subject detail and students who have registered for specific subjects. Do the following : 10

(i) Design 1NF relations for the University described above, enumerating attributes for each of the relations.

(ii) Identify the functional dependencies (FDs) in the relations designed in part(i)

(iii) Using the FDs (identified in the part(ii) above) normalise the relations in 3NF.

(b) Suppose the write ahead Log Scheme is being used. Give the REDO and UNDO processes in the strategy of writing the partial update made by a transaction to the database, as well as in the strategy of delaying all writes to database till the commit. 5