Advanced Diploma in Information Technology (ADIT) / Bachelor in Information Technology (BIT)

Term-End Examination

December, 2006

CST-203 : RELATIONAL DATABASE MANAGEMENT SYSTEMS

Time : 2 Hours *Maximum Marks : 50*

Note : *There are **two** Sections in this paper. Section A consists of objective type questions and short answer type questions. All questions in Section A are **compulsory**. Section A carries 26 marks. Section B consists of three questions. Attempt any **two** questions from Section B. Section B carries 24 marks.*

SECTION A

1. There are 10 objective type questions. There are four choices for each question. Select the best answer. If you feel that none of the given choices is correct, then mark '0' as your answer. Each question carries 1 mark. *1×10=10*

(i) Who developed ER model ?

(a) Codd

(b) C.J. Date

(c) Boyce

(d) Bachman

(ii) Abstraction

(a) hides extra file details

(b) defines an overall representation of an event

(c) is hypothetical in nature

(d) defines ER model

(iii) Shared and exclusive locks allow greater

(a) number of locks

(b) concurrency

(c) deadlocks

(d) live locks

(iv) The decomposition of a relation R(A, B, C, D, E, F) having a key AB and a set of FDs, $B \rightarrow D$, $A \rightarrow F$, $E \rightarrow F$ and $F \rightarrow E$ into R1(AF); R2(BD) and R3(EF) is

(a) lossless decomposition

(b) bad decomposition

(c) not dependency preserving

(d) None of the above

(v) SET clause is used in

(a) INSERT

(b) DELETE

(c) UPDATE

(d) All of the above

(vi) Intersection operation on P and Q can be represented as

(a) P — (P + Q)

(b) P * Q — (P + Q)

(c) P — (P — Q)

(d) Q + (P — Q)

(vii) Following clause restricts the number of rows that are to be retrieved :

(a) SELECT

(b) FROM

(c) WHERE

(d) All of the above

(viii) Which is the formal process for deciding which attributes should be grouped together in a relation ?

(a) Normalization

(b) Performance tuning

(c) Optimization

(d) None of the above

(ix) An error

(a) causes a program to terminate

(b) brings database to an inconsistent state

(c) may occur because of physical state of database

(d) can result only due to hardware failure

(x) Wait-die scheme of deadlock prevention is :

(a) If a resource is held by a transaction, then the older transaction waits but a newer transaction dies

(b) If a resource is held by a transaction, then the newer transaction waits but an older transaction dies

(c) If a resource is held by a transaction only one can wait, rest all will die

(d) None of the above

2. (a) List three differences between primary and secondary index.

(b) Define the terms Candidate key, Primary key and Alternate key.

(c) You have been designated as DBA of an organization. List at least six responsibilities assigned to you.

3. Explain three differences in each of the following pairs :

(i) 3NF and BCNF

(ii) Concept of object in OO model and Concept of entity in ER model

(iii) Shared & exclusive locks and 2 phase locking

SECTION B

*There are three questions in this section. Attempt any **two**. This section carries 24 marks. Please give to the point answers.*

4. (a) Consider the following relations : *8*

Expert (expert_name, phone, address, speciality)

Training_Programme (training_no, topic)

Conducted_Training_Programme (expert_name, training_no, date, venue)

Assume that the speciality field in Expert relation has same domain as that of topic field in Training relation.

Answer the following queries using SQL :

- Find the expert details who have conducted more than two training programmes.
- Find the pair of training programmes that were conducted at the same venue.
- Find the topic of most conducted training.
- Find the list of experts who are most suited for a training programme whose topic is DBMS or RDBMS.

(b) Explain the following in context of Relational Database Management Systems : *4*

(i) Anomalies in a relation

(ii) Security using views

5. (a) A library stores the information about the books and the student to whom the book has been issued as *8*

Book_member (bookcode, b_title, b_authors, date_of_purchase, accn_no, stud_code, stud_name, stud_prog)

A book can be issued to only one student at a time, however a student may be issued many books. The student code is unique and a student can enrol only for one programme. Identify the functional dependencies and candidate keys for the database. Design the normalized tables showing all the steps. State the integrity constraints, if any. Make and state the assumptions, if any.

(b) What is deadlock ? How can it occur in RDBMS ? Explain with the help of example. *4*

6. (a) Construct an ER diagram for a hospital system consisting of patients, doctors, lab tests, medicine prescription, payment slips. Make suitable assumptions. Clearly mention the entities, relationships and primary key. Also mention the reason for selection of entities and relationships. Make suitable assumptions, if any. *8*

(b) What is a system log used for ? What is the typical information that is stored in a system log ? What is transaction commit point ? Why is it important ? *4*