Nepal college of information technology

assessment

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| Level: Bachelor | Semester – Spring | Year : 2013 | |
| Programme: BE-IT-IV | | Full Marks : 100 | |
| Course: Database Management System | | Time : 3hrs. | |
| *Candidates are required to give their answers in their own words as far as practicable.* | | |
| *The figures in the margin indicate full marks.*  *Assume suitable data if necessary* | | |
| *If you need to make any assumptions, you may do so but you should document them in your answers.* Attempt all the questions. | | |

1. (a) What are the major responsibilities of Database Administrator. List and Explain. [7]

(b) Construct an E-R diagram for a car-insurance company whose customers own one or more cars each. Each car has associated with it zero to any number of recorded accidents. [8]

2. (a) Explain the distinctions among the terms primary key, candidate key, super key and foreign key. [7]

(b) Consider the relational database of Figure below, where the primary keys are underlined. Give an expression in the relational algebra to express each of the following queries: [8]

employee (person-name, street, city)

works (person-name, bank-name, salary)

bank (bank-name, city)

manages (person-name, manager-name)

(i) Find the names of all employees who work for Nepal Rastra Bank and Salary greater than $10,000.

(ii) Find the names and cities of residence of all employees who work for Nepal Rastra Bank.

iii) Find the names, street address, and cities of residence of all employees who work for Nepal Rastra Bank Corporation and earn more than $10,000 per annum

3. Consider the employee database of figure given below, where primary keys are underlined. Give an expression in SQL for each of following queries. [15]

employee (employee-name, street, city)

works ( employee-name, company-name, salary)

company ( company-name, city)

manages ( employee-name, manager-name)

(i) Modify the database so that Jones now lives in Newtown.

(ii) Give all employees of First Bank Corporation a 10 percent raise.

(iii) Give all managers of First Bank Corporation a 10 percent raise.

(iv) Delete all tuples in the works relation for employees of Small Bank Corporation.

(v) Find all employees who earn more than the average salary of all employees of their company.

4 (a) What are the roles of Assertions and Triggers in SQL? Explain. When Triggers are not appropriate to use? Give an example. [7]

(b) What is Normalization and why it is done? Give an example of a relation schema R and a set of dependencies such that R is not in 3NF and normalize it into 3NF. [8]

5 (a) How security can be granted using view explain. What are two advantages of encrypting data stored in the database? [7]

(b) Show how to derive the following equivalences by a sequence of transformations using the equivalence rules. [8]

i). σθ1 ∧θ2 ∧θ3 (E) = σθ1 (σθ2 (σθ3 (E)))

ii). σθ1 ∧θ2 (E1 E2 ) = σθ1 (E1  (σθ2 (E2 ))), where θ2 involves only attributes from E2.

6 (a) List the ACID properties. Explain the usefulness of each. [7]

(b) What is Log-Based Recovery? Explain Defferred Database modification with an illustration. [8]

7 Write short notes on(any two): [2\*5=10]

(i) Failure Classification (ii) Basic steps in Query Processing (iii) DBMS Applications