Code: AC14 / AT11 **Subject: DATABASE MANAGEMENT SYST**
Time: 3 Hours **Max. Marks: 1**

DECEMBER 2010

NOTE: There are 9 Questions in all.

- **Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.**
- **The answer sheet for the Q.1 will be collected by the invigilator after half an hour of the commencement of the examination.**
- **Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.**
- **Any required data not explicitly given, may be suitably assumed and stated.**

Q.1 Choose the correct or the best alternative in the following: **(2×10)**

a. The database environment has all of the following components except:

(A) Separate files **(B)** Users
(C) Query language **(D)** Data base

b. In order to create and maintain index files, a computer creates a ____and a ____.

(A) data file, key file **(B)** index file , key file
(C) data file, chain file . **(D)** data file, index file .

c. Another word for index of indexes is_____.

(A) single level index **(B)** hashed file
(C) non-hashed file **(D)** multi-level index

d. The SQL statements that are not known before the program executes, are called

(A) static SQL **(B)** embedded SQL
(C) dynamic SQL **(D)** cursor

e. _____ is a logical table that derives data from other tables.

(A) database **(B)** view
(C) table **(D)** relation

f. The operation of eliminating columns in a table is called

(A) select **(B)** intersect
(C) project **(D)** union.

g. When we preserve information after decomposition, we call it as_____.

(A) lossy decomposition **(B)** preserved decomposition
(C) lossless decomposition **(D)** without loss decomposition

h. A transaction processing system is also called

(A) TP monitor **(B)** transaction monitor
(C) processing monitor **(D)** monitor

i. Flat, Chained & Nested are the types of_____.

(A) transaction models **(B)** system models
(C) database models **(D)** locks

j. The first step in query processing is_____.

(A) optimization **(B)** decomposition
(C) execution **(D)** choosing low level operations.

Answer any FIVE Questions out of EIGHT Questions.
Each question carries 16 marks.

Q.2 a. What do you understand by DBA and how he plays an important role? **(8)**

b. Design an E-R diagram for a Book store and customer relationship, where each shopping basket contains books of different authors and publishers. **(8)**

Q.3. a. How Relational Calculus is different from Relational Algebra? **(8)**
Consider the relations:

branch (branch_name, branch_city, assets)
customer (customer_name, customer_street, customer_city)
account (account_number, branch_name, balance)
loan (loan_number, branch_name, amount)
depositor (customer_name, account_number)
borrower (customer_name, loan_number)

Write the TRC and DRC query for the following query:

"Find the names of all customers having a loan, an account or both at the bank"

b. What do you mean by complete Set of Relational Algebra Operations? Why is this set called complete? Show how intersection operator can be implemented using other operators. **(8)**

Q.4 a. Consider the employee database , where the primary keys are underlined. **(8)**
employee (employee_name, street, city)
works (employee_name, company name, salary)
company (company_name, city)
manages (employee_name, manager name)
Give an expression in SQL for each of the following queries.

(i) Find the names of all employees who work for First Bank Corporation.

(ii) Find all employees in the database who live in the same cities as the companies for which they work.
(iii) Find all employees in the database who live in the same cities and on the same streets as do their managers.
(iv) Find all employees who earn more than the average salary of all employees of their company.

b. Explain the SQL operators BETWEEN—AND, IN , LIKE and IS_NULL by taking suitable examples **(8)**

Q.5 a. Explain what is meant by repetition of information and inability to represent information. Explain why each of these properties may indicate a bad relational database design. **(8)**

b. Explain the following Hash functions with one example of each: **(8)**
(i) Mid square method
(ii) Radix conversion

Q.6 a. Explain 4NF with a suitable example. Explain why 4NF is more desirable than BCNF **(8)**

b. Suppose a relation is stored in a B^+-tree file organization. Suppose secondary indices stored record identifiers that are pointers to records on disk.
(i) What would be the effect on the secondary indices if a page split happens in the file organization?
(ii) What would be the cost of updating all affected records in a secondary index?
(iii) How does using the search key of the file organization as a logical record identifier solve this problem?
(iv) What is the extra cost due to the use of such logical record identifiers? **(8)**

Q.7 a. What are the General Transformation Rules for Relational operations? **(8)**

b. What is query processing? Explain the sort merge strategies of query processing. **(8)**

Q.8 a. Discuss the Timestamp-ordering protocol for concurrency control. How does strict Timestamp-ordering differs from basic Timestamp-ordering? **(8)**

b. What is a certify lock? What are the advantages and disadvantages of using certify locks. **(8)**

Q.9 Explain the following: **(4×4=16)**

(i) Data types in SQL
(ii) Disadvantages of Relational Approach
(iii) Extension and Intension
(iv) ACID properties of transaction