Third Semester MCA Degree Examination, June 2012
Data Base Management System

Time: 3 hrs.   Max. Marks:100

Note: *Answer any FIVE full questions.*

1 a. What is DBMS? Explain database system with a schemantic diagram. Describe the classification of database management system. **(10 Marks)**

     b. Discuss in detail about advantages of DBMS over traditional file system. **(10 Marks)**

2 a. Explain three-schema architecture with a neat diagram. What is meant by independence? Explain briefly different types of it. **(10 Marks)**

     b. Discuss the main characteristics of database approach. How is it different from traditional file system? Write all the main functions of DBA. **(10 Marks)**

3 a. Construct an E-R diagram for company database. The company keeps track of company′s employees, projects and departments. Each department controls a number of projects and employees can work for any number of projects. The company keeps track of dependents of each employee for insurance purpose. For the above E-R diagram develop relational database schema mapping. **(10 Marks)**

     b. Differentiate a sub query and correlated sub query. Discuss the relational model constraints. **(10 Marks)**

4 a. Define the relational algebra. Explain various relational algebra operations with examples. **(10 Marks)**

     b. Consider the following schema:
Employee (Fname, Minit, Lname, <u>Ssn,</u> Bdate, Address, Gender, Salary, Super_ssn, Dno)
Department (Dname, <u>Dnumber</u>, Mgr_ssn, Mgr_start_date)
Dept_Locations (<u>Dnumber</u>, <u>Dlocation</u>)
Project (Pname, <u>Pnumber</u>, <u>Plocation</u>, Dnum)
Works_On (<u>Essn</u>, <u>Pno</u>, Hours)
Dependent (<u>Essn</u>, <u>Dependent_name</u>, gender, Bdate, Relationship)
The key fields are underlined. Write the following Queries in <u>Relation Algebra</u>.
i) Retrieve the name and address of all employees who work for the′Research′ department.
ii) For every project located in ′Stafford′, list the project number, the controlling department number, and the department manager′s last name, address and birth date.
iii) Find the names of employees who work on all the projects controlled by department number 5.
iv) List the names of all employees with two or more dependents.
v) List the names of all managers who have at least one dependent. **(10 Marks)**

5 a. Consider the following relations:
Student (<u>Snum</u>, Sname, Major, Level, Age)
Class (<u>Name</u>, <u>Meets-at</u>, <u>Room</u>, Fid)
Enrolled (<u>Snum</u>, Cname)
Faculty (<u>Fid</u>, Fname, Deptid)
Write the following queries in <u>SQL</u>. No duplicates should be Printed in any of the answers.
i) Find the names of all juniors (Level = JR) who are enrolled in a class taught by ′Prof. Harshith′.
ii) Find the names of all classes that either meet in room ′R128′ or have five or more students enrolled.

iii) Find the names of all students who are enrolled in two classes that meet at the same time.

iv) Find the names of faculty members who teach in every room in which some class is taught.

v) Find the names of faculty members for whom the combined enrollment of the courses that they teach is less than five. **(10 Marks)**

b. Explain briefly about embedded SQL, dynamic SQL, database stored procedures and functions. **(10 Marks)**

6 a. Define functional dependency. State and prove Armstrong inference rules. How do you say that Armstrong inference rules are sound and complete? **(10 Marks)**

b. Define minimal cover and closure. Write an algorithm to find a minimal cover ′F′ for set of functional dependencties ′E′. **(10 Marks)**

7 a. Define normalization, 1 Nf, 2 Nf, 3 Nf and BCNF. Explain with suitable examples. **(10Marks)**

b. What are the acid properties? Define Atomicity, Consistency, Isolation and Durability and illustrate them through examples. **(10 Marks)**

8 a. What is a locking protocol? Describe the strict two-phase locking protocol. What can you say about the schedules allowed by this protocol? **(10 Marks)**

b. Write ER-TO-RELATIONAL mapping algorithm. **(10 Marks)**

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