CBCS Scheme

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16MCA23

Second Semester MCA Degree Examination, Dec.2017/Jan.2018
Database Management System

Time: 3 hrs. Max. Marks: 80

Note: ***Answer FIVE full questions, choosing one full question from each module.***

Module-1

1 a. What are the advantages of DBMS over Traditional File System? Explain. **(08 Marks)**

b. Explain 3 – schema Architecture. What do you mean by Data Independence? Explain briefly about different types of it. **(08 Marks)**

OR

2 a. Discuss the main characteristics of Database approach and how is it differs from Traditional File system. What are the main functions of DBA? **(08 Marks)**

b. Explain the centralized , Two – Tier , Three – Tier and N – Tier Client Server Architectures for DBMS. **(08 Marks)**

Module-2

3 a. Define the term Relational Algebra expression. Explain in detail about complete set of Relational Algebra Operations with examples. **(08 Marks)**

b. Write ER – To – Relational mapping algorithm, with an example. **(08 Marks)**

OR

4 Consider the following schema : **(16 Marks)**

EMPLOYEE (Fname, Minit , Lname, Ssn, Bdate , Address, Gender , Salary , Super Ssn, Dno)
DEPARTMENT (Dname, Dnumber, Mgr_Ssn , Mgr_Start_date)
DEPT_LOCATIONS (Dnumber , Dlocation)
PROJECT (Pname, Pnumber, Plocation, Dnum)
WORKS_ON (Essn, Pno, Hours)
DEPENDENT (Essn, Dependent_name, Gender, Bdate, Relationship)

The key fields are underlined. Answer all of the following queries in Relational Algebra.

a. Retrieve the name and address of all employees who work for the 'Research' Department.
b. For every project located in 'Stafford', list the project number, the controlling department number and the department managers last name, address and birth date.
c. Find the names of employees who work on all the projects controlled by department number 5.
d. Make a list of project numbers for projects that involve an employee whose last name is 'SMITH', either as a worker or as a manager of the department that controls the project.
e. List the name of all employees with two or more dependents.
f. Retrieve the names of employees who have no dependents.
g. List the names of managers who have at least one dependent.
h. Retrieve the social security numbers of all employees who either work in the department no 5 or directly supervise an employee who works in department no 5.

Module-3

5 a. Differentiate a nested sub query and correlated sub query. What are the set operations of SQL? Discuss. **(08 Marks)**

b. Explain about all integrity constraints with examples. **(08 Marks)**

OR

6 Consider the following schema : **(16 Marks)**

Department (Dept_name, Building , Budget)
Course (Course_id, Title, Dept_name, Credits)
Instructor (Id, Name, Dept_name, Salary)
Section (Course_id, Sec_id, Semester, Year, Building , Room_number, Time_Slot_id)
Teaches (Id, Course_id, Sec_id, Semester, Year)
The key fields are underlined. Answer all of the following queries in SQL.

a) Find the set of all courses taught in the fall 2009 as well as in spring 2010.
b) Find the number of Instructors in each department who teach a course in the spring 2010 semester.
c) Select the names of instructors whose names are neither "MOZART" Nor "EINSTEIN".
d) Find the departments that have the highest average salary.
e) Find all courses taught in both the fall 2009 semester and in the spring 2010 by using exists construct.
f) Find all students who have taken all courses offered in the Biology Department.
g) Find all courses that were offered at most once in 2009.
h) Give a 5% salary raise to instructors whose salary is less than average.

Module-4

7 a. Give all four informal design guidelines for relation schemas. **(08 Marks)**
b. Define Functional Dependency. State and prove Arm Strong's inference rules. **(08 Marks)**

OR

8 a. What is Normalisation? Define 1st, 2nd and Boyce – Codd Normal forms. **(08 Marks)**
b. Explain about Database stored procedures and functions. Define a minimal cover. **(08 Marks)**

Module-5

9 a. Discuss about Transaction Atomicity and Durability. What do you mean by Serializability? Explain. **(08 Marks)**
b. What are the levels of Transaction Isolation, do you have? How do you implement Isolation levels? Explain. **(08 Marks)**

OR

10 a. Explain briefly about all Lock – Based Protocols. **(08 Marks)**
b. Discuss briefly about Failure classification and Recovery Algorithm. **(08 Marks)**

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