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13MCA25

Second Semester MCA Degree Examination, Dec.2015/Jan.2016
Database Management Systems

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions.

1. a. Discuss the main characteristics of the database approach. How does it differ from the traditional file system? (08 Marks)
 b. Briefly discuss the advantages of using the DBMS. (08 Marks)
 c. What are the responsibilities of database administrators and database designers? (04 Marks)
2. a. What is the difference between logical data independence and physical data independence? Which one is harder to achieve? (04 Marks)
 b. Explain the component modules of DBMS and their interaction, with the help of a diagram. (10 Marks)
 c. Explain the operation of a two – tier client / server architecture for DBMS. (06 Marks)
3. a. Define an Entity and an Attribute. Explain the different types of attributes that occur in an ER model, with an example. (10 Marks)
 b. Describe the various steps of an algorithm for ER – to – Relational mapping, with the help of COMPANY relational database schema. (10 Marks)
4. a. Explain how the different modification operations deal with constraint violations. (10 Marks)
 b. Define the following terms with an example each :
 i) Super Key ii) Domain iii) Entity – Integrity Constraints
 iv) Tuples v) The Relational database schema. (10 Marks)
5. a. List the operations of relational algebra and purpose of each with the notations. (10 Marks)
 b. Consider the two tables T₁ & T₂. Show the results of the following operations :

- i) $T_1 \bowtie_{(T_1.P = T_2.A)} T_2$
- ii) $T_1 \bowtie_{(T_1.Q = T_2.B)} T_2$
- iii) $T_1 \bowtie_{(T_1.P = T_2.A)} T_2$
- iv) $T_1 \bowtie_{(T_1.P = T_2.A \text{ AND } T_1.R = T_2.C)} T_2$
- v) $T_1 \cup T_2$

(Assume T₁ and T₂ are union compatible)

| P | Q | R |
|----|---|---|
| 10 | a | 5 |
| 15 | b | 8 |
| 25 | a | 6 |

| A | B | C |
|----|---|---|
| 10 | b | 6 |
| 25 | c | 3 |
| 10 | b | 5 |

(10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
 2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

- 6 a. Explain the IN and EXISTS operators with suitable examples. (08 Marks)
- b. Consider the following relations and write the following queries in SQL.
Employee (Fname , Lname, SSN, Sex, Salary, Super_SSN, DNO1)
Department (Dname, DNO, Mgr_SSN)
Project (Pname, PNO, Plocation, DNO2)
Works_On (ESSN, PNO1, Hours)
Dependent (ESSN, Depend_Name, Sex, Relationship).
- i) Retrieve the name and salary of all employees who work for the 'Research' department.
ii) Retrieve a list of employees and the projects they working on, ordered by department and within each department ordered alphabetically by last name.
iii) Retrieve the name of all employees who do not have supervisors.
iv) Retrieve the name of each employee who has a dependent with same first name and same sex as the employee. (12 Marks)
- 7 a. What is the need of normalization? Explain the first, second and third normal forms with examples. (14 Marks)
- b. Explain informal design guidelines for Relational schemas. (06 Marks)
- 8 a. What is PL/SQL? Explain the features and advantages of PL/SQL. (10 Marks)
- b. Explain about the various functions and procedures used in PL/SQL. (10 Marks)
