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MCS-023

08907

MCA (Revised)

Term-End Examination

June, 2012

MCS-023 : DATABASE MANAGEMENT SYSTEMS

Time : 3 hours *Maximum Marks : 100*

(Weightage 75%)

Note : *Question No. **1** is **compulsory**. Attempt **any three** questions from the rest.*

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1. (a) Explain the role of the following components of Database Management System. **6**

(i) Transaction Manager

(ii) Query Processor

(iii) Storage Manager

(b) Consider the following relation schemas R = (A, B, C) and S = (D, E, F) with r an s be the corresponding relations respectively. Give an expression in SQL for the following queries : **4**

(i) $\pi A(r)$

(ii) $\sigma_{(B=17)}(r)$

(iii) $r \times s$

(iv) $\pi A, F\left(\sigma_{c=D}(rxs)\right)$

(c) Define primary key, candidate key, super key and foreign key **4**

(d) Decompose the relation R = (A, B, C, D, E) with the set of functional dependencies 4

$A \rightarrow BC$

$CD \rightarrow E$

$B \rightarrow D$ into 3NF relation

(e) What are the functions of a Database Administrator. 5

(f) Justify the following statements 6

(i) Two phase locking leads to serializability schedules.

(ii) A Relation in BCNF is also in 3NF.

(g) Discuss the problems associated with concurrent transactions. 6

(h) Write down the advantages and disadvantages of distributed DBMS. 5

2. For the following problem definition :

The book club has members. The book club sells books to its members. The members places orders for books, which the book club fulfils. Each order contains one or more than one books. The books are written by author (s). The publisher publishes the book. An author can write more than one book and a book can have more than one author. A book is published by a publisher, but a publisher publishes many books. A member can place more than one order. The member also can choose not to place an order. The book club sells many books.

(a) Draw an E - R Diagram 10

(b) Map the ER Diagram to Relational model. 10

3. (a) Consider the following Tables : **16**

Works (Pname, Cname, salary)

LIVES (Pname, street, city)

LOCATED (Cname, city)

MANAGER (Pname, Mname)

Write queries in SQL for the following

(i) List the names of the people who work for the company Wipro along with the cities they live in.

(ii) Find the people who work for the company 'Infosys' having salary greater than Rs - 50000/-

(iii) List the names of the people, along with the street and city addresses.

(iv) Find the persons whose salaries are more than that of all of the 'Oracle' employees.

(v) And the name of the persons who do not work in 'Infosys'.

(vi) Find the average salary of the employee in company named 'accenture'.

(vii) Create a table for the above relation using SQL - DDL

(viii) Create a view consisting of the person name along with their manager name and company name.

(b) What are the problems caused by deadlock ? Give a Mechanism to detect deadlock. **4**

4. (a) Explain the purpose of check points in database recovery. 4

(b) Why is a B tree a better structure than a binary search tree for implementation of an index ? 5

(c) Explain the log based recovery in Database systems. 5

(d) Consider the relation R (A, B, C, D, E) and the set of functional dependencies :-

$F(A \rightarrow D, \{A,B\} \rightarrow C, D \rightarrow E)$

(i) Which of the following are candidate keys ?

(A) {A}

(B) {A, B}

(C) {A, E}

(ii) Consider the decomposition of R into $\{R_1$ (A, B, C) and R_2 (A, D, E)$\}$. Is this decomposition lossless ? Justify ? 6

5. (a) Discuss the measures that are used to provide security of data in databases. 5

(b) What is a fragment of a relation ? What are the main types of fragments ? Why is fragmentation used in distributed Database Design ? 5

(c) Discuss the different states of a Transaction with the help of a diagram. 4

(d) Explain the following terms : 6

(i) Secondary Index

(ii) Data Dictionary

(iii) Division operation in Relational Algebra.