No. of Printed Pages : 5

MCS-023

05023

MCA (Revised)

Term-End Examination

December, 2010

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.*

1. (a) State the two integrity rules. Also explain through an example when these two rules are violated ? **2+2**

(b) Define 2NF. Justify whether the following "Products" relation is in 2NF or not. In case it does not satisfy 2NF, decompose it into a set of relations which do satisfy 2NF. What advantages are gained by this decomposition Products Relation. **2+5+1**

Brand Name	Size	Price	Manufacturer
B1	L	P1	MF1
B1	E	P2	MF1
B2	L	P3	MF1
B2	E	P4	MF1
B3	E	P5	MF2
B3	L	P6	MF2

(c) Consider the following database schema : **10**

Student (Name, Student Number, Class, Major)

Course(Course Name, Course Number Credit Hours, Department)

Section (Section ID,Course Number, Semester, Year, professor)

Grade-Report (Student Number, Section ID, Grade)

Prerequisite(Course Number, Prerequisite Number)

Specify the following question using SQL

(i) Retrieve the names of all students majoring in CS

(ii) Retrieve the names of all courses taught by professor P1 in the years 2000 and 2001

(iii) Retrieve the name and transcript (Course Name, course Number, Credit Hours, Semester, Year and Grade) of each student majoring in CS

(iv) Retrieve the names and major of all student who have a grade A in atleast one course.

(v) Retreive the names and major departments of all students who do not have a A grade in any of their Courses

(d) List all the four types of constraints which may be violated while inserting a new record into a relation. Explain through an example. 2+4

(e) What are Sparse and dense indexes ? 2+2

(f) What is the two phase locking protocol ? How does it guarantee Serializability Explain . 2+3

(g) Define the following terms: 3

- Concurrency
- Data Dictionary

2. (a) Draw an E-R Diagram for the following statements. Make and state any reasonable assumptions. 10

"Dr X is Starting a medical practice. He wants a Computerized system to manage the appointments, maintain patients records and generate reports. When a patient calls for an appointment, the receptionist checks the schedule and fixes the appointment at the earlier date. The receptionist enters the appointment with patients name, purpose of appointment and the date of appointment agreed upon, The system verifies the patients name and supplies the necessary details from the patient's record. The system should also print weekly schedule"

(b) Explain the B-Tree index with the help of a diagram. What are the advantages of using B-Tree indexes ? 5

(c) Construct an example for each of the following relational algebraic operations: 5

(i) Select

(ii) Project

(iii) Cartesian product

(iv) Union

(v) Join

3. Differentiate between the following. 20

(i) Backward recovery and Forward recovery

(ii) Horizontal and vertical fragmentation

(iii) outer join and Self join

(iv) Serial schedule and serializable schedule

(v) 3NF and BCNF

4. (a) Write and explain the following schemes in order to prevent deadlock. 6

- wait die scheme
- would-wait scheme

(b) What are the problems which may occur when transactions are executed concurrently. Explain each of them with the help of an example. 8

(c) Write all the steps for distributed database design and explain. 2+4

5. (a) What are the differences among primary, secondary and clustering indexes ? Explain these with the help of suitable example. List the issues in implementation of each of these indexes. **10**

(b) Explain the terms transaction roll back and credit roll back. **4**

(c) When the decomposition of a relation is lossy? Explain with the help an example. **3+3**
