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RN-7363

B. E. - IV (Sem. VII) (CO/IT Engg.) Examination

May / June – 2010

Database Management Systems

Time : **3** Hours] [Total Marks : **100**

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ **B. E. - 4 (Sem. 7) (CO/IT Engg.)**

Name of the Subject :

☛ **Database Management Systems**

☛Subject Code No. : **7 3 6 3** ☛Section No. (1, 2,.....) : **1&2**

Seat No. :

Student's Signature

(2) Use Seperate answer sheet for each section.
(3) Make Assumptions wherever required.
(4) Numbers on the right side indicate Karks.

SECTION-I:

Q-1

(A) Do As Directed: **[10]**

1. RAID Level 5 is also known as _____ . 2

2. PJNF is also known as _____.

3. Define Following: 8
   1. Normalization
   2. Trivial Functional Dependencies
   3. Extraneous Attributes
   4. Seek Time

(B) Answer the Following: **[10]**

1. An Engineering Consultancy firm supplies temporary specialized staff to bigger companies in the country to work on their project for certain amount of time. The table below lists the time spent by each of the company's employees at other companies to carry out projects. The national insurance number (NIN) is unique for every member of staff.

NIN	Contract No.	Hours	Employee Name	Company ID	Company Location
616681B	SC1025	72	P. White	SC115	Belfast
674315A	SC1025	48	R. Press	SC115	Belfast
323113B	SC1026	24	P. Smith	SC23	Bangor
616681B	SC1026	24	P. White	SC23	Bangor

a. Explain in which Normal Form this table is.
b. Fine the Primary Key for this relation and explain your choice.
c. Normalize the table to 1 NF.
d. Normalize the table to 2 NF.
e. Normalize the table to 3 NF.

Q-2. Answer the Following: (Any Three) **[15]**

1. List pitfalls of RDBMS and explain each with example.
2. State and Explain Armstrong's Axiom Rules.
3. Explain Assertions and Triggers with example.
4. Discuss BCNF v/s 3NF.
5. Compare Object oriented and Object Relational Databases.

Q-3. Answer the following: (Any Three) **[15]**

1. Describe sorting with suitable example.
2. Explain the distinction between closed and open hashing. Discuss the relative merits of each technique in database applications.
3. Explain Data Mining.
4. Explain Data Warehousing and list it's advantages.
5. Write a note on Spatial and Geographic Data.

SECTION II

Q:4 A **10**

i) Fill in the blanks 4

1. The phantom read problem is a special case of _____
2. If we execute the transaction strictly in sequence , one at a time , then the schedule is called a _____
3. _____ is a protocol that guarantees that if all the transactions obey it, all the possible interleaved schedules become serialisable.7
4. Failure recovery & media recovery fall under _____

ii) Describe the concept of deadlock 2

iii) Most implementations of database systems use strict two-phase locking. Suggest three reasons for the popularity of this protocol. 2

iv) In timestamp ordering, W-timestamp (Q) denotes the largest timestamp of any transaction that executed write (Q) successfully. Suppose that, instead, we defined it to be the timestamp of the most recent transaction to execute write (Q) successfully. Would this change in wording make any difference? Explain your answer. 2

B Consider the following two transactions: **10**

```
T1:
    read(A);
    read(B);
if A = 0 then B := B+1;
    write (B).

T2:
    read(B);
    read(A);
if B = 0 then A:=A+1;
write (A).
```

Add lock and unlock instructions to transactions T1 and T2, so that they observe the two-phase locking protocol. Can the execution of these transactions result in a deadlock?

Q:5 **Answer the Following.** **14**

1 When a transaction is rolled back under timestamp ordering, it is assigned a new timestamp. Why can it not simply keep its old timestamp? 4

2 Show that the two-phase locking protocol ensures conflict serializability, and that transactions can be serialized according to their lock points. 6

3 Under a modified version of the timestamp protocol, we require that a commit bit be tested to see whether a read request must wait. Explain how the commit bit can prevent cascading abort. Why is this test not necessary for write requests? 4

OR

Explain the difference between the three storage types—volatile, nonvolatile, and stable—in terms of I/O cost.

Q:6 **Write short note on the following. (Any Four)** **16**

1 Multiversion timestamp ordering
2 The tree protocol
3 Shadow Paging
4 View Serializability
5 ACID Properties

OR

Q:6 **Answer the following:**

1 Explain the purpose of the checkpoint mechanism. How often should checkpoints be performed? How does the frequency of checkpoints affect 4
   - System performance when no failure occurs
   - The time it takes to recover from a system crash
   - The time it takes to recover from a disk crash

2 Show by example that there are schedules that are possible under the two-phase locking protocol, but are not possible under the timestamp protocol & vice-versa. 6

3 Compare the deferred- and immediate-modification versions of the log-based recovery scheme in terms of ease of implementation and overhead cost. 6