(Please Write your Exam Roll No. immediately) Exam. Roll No. ……..

END-TERM EXAMINATION

DECEMBER 2006

Exam Series Code: 100132DEC06200082

Paper Code : MCA-203 **Subject: Database Management System**

Time: 3 Hours **Maximum Marks: 60**

Note: Q. 1 is compulsory and attempts any four questions from the rest.

Q. 1. (a) What is the difference between Physical data independence and logical data independence? **(4)**

(b) What is a participation role? When is it necessary to use role homes in the description of relationship types? **(4)**

(c) Define foreign key. What is this concept used for? **(4)**

(d) What is a functional dependency? Explain with the help of example. **(4)**

(e) Discuss the null values and dangling type problem. **(4)**

Q. 2. Consider the relation for published books:

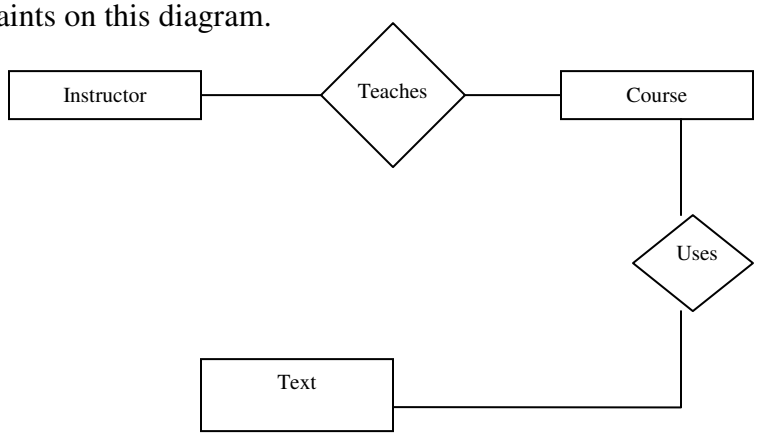
BOOK (Book-title, Authorname, Book-type, Listprice, Author-affil, Publisher)
Author-affil refers to the affiliation of author. Suppose the following dependencies exist:
Book-title → Publisher, Book-type
Book-type →Listprice
Authorname → Author-affil

(a) What normal form is the relation in? Explain your answer. **(4)**

(b) Apply normalization until you can not decompose the relation further. State the reason behind each decomposition. **(6)**

Q. 3. (a) Consider the E-R diagram given below: **(5)**

Assume that a course may or may not use text book, but that a text by definition is a book that is used in some course. A course may not use more than five books. Instructor teaches from two to four courses. Supply (min, max) constraints on this diagram.



(b) What is meant by recursive relationship type? Give an example. **(5)**

Q. 4. (a) Consider the two tables T1 and T2 shown below. Show the result of the following operations : **(5)**

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

A	B	C
10	B	6
25	C	3
10	B	5

(i) T1 [X] T1.Q = T2.B T2
(ii) T1 [X] T1.P = T2.A T2

(b) Consider the following relations for a database that keeps track of business trips of salespersons in a sales office: **(5)**

SALESPERSON (SSN, Name, Start-Year, Dept-no)
TRIP (SSN, From-City, To-City, Departure-Date, Return-Date, TRIP-ID)
EXPENSE (Trip-ID, Account#, Amount)

(i) Print the SSN of Salesman who took trips of 'Honolulu'.
(ii) Print the total trip expenses incurred by the salesman with SSN='23456789'.

Q. 5. (a) Consider the tree transactions T1, T2 and T3 given below: **(7)**

T_1 : r_1 (X); r_1 (Z); w_1 (X);
T_2 : r_2 (Z); r_2 (Y); w_2 (Z); w_2 (Y);
T_3 : r_3 (X); r_3 (Y); w_3 (Y);

Consider the following schedule S:
S : r_1 (X); r_2 (Z); r_3(X); r_3 (Y);
w_1 (X); w_3 (Y); r_2(Y); w_2 (Z); w_2 (Y);

Draw the serializability graphs for S_1 and S_2 and state whether schedule is serializable or not.

(b) Draw a state diagram, and discuss the typical state that a transition goes through during execution. **(3)**

Q. 6. (a) Describe the wait-die and wound-wait protocols for deadlock prevention. **(5)**
(b) What is a time stamp? How does system generate time stamps? **(5)**

Q. 7. (a) What are UNDO-type and REDO-type log entries? **(3)**
(b) What is meant by transaction rollback? Which recovery techniques do not require any rollback? **(7)**

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END-TERM EXAMINATION

Third Semester [MCA] - DECEMBER 2005

Paper Code: MCA 203 **Subject: Database Management System**

Time: 3 Hours **(Batch-2004)** **Maximum Marks: 60**

Note: Q. 1 is compulsory. Attempt any four questions from the rest of the paper.

Q. 1. (a) State true or false **12 x 0.5 = 6**

(i) Using a set of files is better than a database
(ii) Data redundancy means multiple copies of the same data item.
(iii) Foreign key in a relation is one arbitrarily chosen from the set of candidate keys of that relation.
(iv) Null values are sometimes permitted in primary key attributes.
(v) Some information is useless.
(vi) Null values are sometimes permitted in foreign key attributes.
(vii) The DDL specifies specific how queries are evaluated.
(viii) Data independence means each piece of data in the database is independent of other pieces.
(ix) In nested queries, one select statement is written inside another.
(x) A transaction is a set of operations that must be performed completely or not at all.
(xi) A commit statement indicates the end of transaction.
(xii) Decomposition means breaking one table down into multiple tables.

(b) Answer the following short answer questions: - **2 x 7 = 14**

(i) What is data independence?
(ii) Explain the concept of a domain.
(iii) Describe the ACID property of a transaction?
(iv) What do you mean by weak entity?
(v) Define primary key and super key.
(vi) What are integrity constraints?
(vii) Define the term normalization.

Q. 2. (a) What is a DBMS? How does it differ from a conventional file system? **5**
(b) Explain the architecture of a Database system? **5**

Q. 3. (a) Make an ER-diagram for a library system? Clearly mention all the entities, their attributes and the relationship among the entities. **6**
(b) Map this ER model into corresponding relational model. **4**

Q. 4. Consider the following relational schema **10**

Account (account-number, branch-name, balance)
Loan (loan-number, branch-name, amount)
Depositor (customer-name, account-number)
Borrower (Customer-name, loan-number)

Answer the queries in SQL:-

(a) Find all loan numbers for loan made at Bombay branch.
(b) Find all customers who have both a loan and an account at the bank.
(c) Find the average account balance at each branch.
(d) Find the number of depositors at each branch.

Q. 5. (a) Discuss different types of transaction failures. **3**
(b) What do you mean by cascading rollback? **3**
(c) Explain any recovery technique in details? **4**

Q. 6. (a) What do you mean by normalization? Explain different normal forms with suitable examples? **5**

(b) Given a relation R (A, B, C, D, E) with the following FDs. **5**

$AB \rightarrow CD,$
$ABC \rightarrow E,$
$C \rightarrow A$

Find the closure of {ABC}+

Q. 7. (a) Explain the two phase locking protocol? What are its advantages and disadvantages? **6**

(b) Discuss the problem of starvation? How it can be solved? **4**

Q. 8. Write note on the following :- **2.5 x 4=10**
(a) Query Processing
(b) Distributed Database Management System
(c) Relational Algebra Operation
(d) Database Administrator
