[Total No. of Questions : 8]

T.E. (COMP) (Semester - V) (RC) Examination, Nov. / Dec. - 2011

DATA BASE MANAGEMENT SYSTEM

Duration : 3 Hours **Total Marks : 100**

Instructions : 1) Answer any five questions, at least one from each Module.
2) Assume suitable data, if necessary.

MODULE - I

Q1) a) With the help of a neat diagram explain the main phases of database design. [7]
b) An existence dependent entity need not be a weak entity. Justify with an example. [4]
c) What is meant by a recursive relationship type? Give an example. [4]
d) What is the difference between a specialization heirarchy and a specialization lattice? [5]

Q2) a) List the various types of attributes used in ER models. [2]
b) Construct an ER diagram for a Hospital with a set of patients and a set of Docters. Associate with each patient a log of the various tests and examinations conducted and treatment given. [5]
c) Discuss the two main types of constraints on specialization. [5]
d) Explain the difference between external, internal and conceptual schemas. How are these different schema layers related to the concepts of logical and physical data independence. [8]

MODULE - II

Q3) a) Discuss the entity integrity and referential integrity constraints why is each considered important. [6]
b) Differentiate between : [4]
i) Outer join and inner join.
ii) Relational Algebra and Relational Calculus.
c) Consider the following schema :
Hotel (Hotel No, Name, City)
Room (Room No, Hotel No, Type, Price)
Booking (Hotel No, Guest No, Date From, Date To, Room No)
Guest (Guest No, Name, Address)

Write SQL statements for the following :

i) How many hotels are there? [1]

ii) List the price and type of all rooms at the Grosvenor Hotel. [2]

iii) List the number of rooms in each hotel in London. [2]

iv) How many different guests have made bookings for August. [2]

v) List the names of guests currently staying at Grosvenor Hotel. [3]

Q4) a) Define the division operation in relational algebra. What kind of queries is it used for? Illustrate with an example. [5]

b) Discuss various types of join operations. Why is theta join required? [7]

c) What is a correlated nested query? Explain with an example. [4]

d) What is meant by closure of a set of functional dependencies. [4]

MODULE - III

Q5) a) Why should need values in a relation be avoided as far as possible? [6]

b) Analyse the sample data in the following table carefully :

PET ID	PET NAME	PET TYPE	PET AGE	OWNER	VISIT DATE	PROCEDURE
246	ROVER	DOG	12	SAM COOK	JAN 13/2002	01 - RABIES VACCINATION
					MAR 27/2002	10 - EXAMINE and TREAT WOUND
					APR 02/2002	05 - HEART WORM TEST
298	SPOT	DOG	2	TERRY KIM	JAN 21/2002	08 - TETANUS VACCINATION
					MAR 10/2002	05 - HEART WORM TEST
341	MORRIS	CAT	4	SAM COOK	JAN 23/2001	01 - RABIES VACCINATION
					JAN 13/2002	01 - RABIES VACCINATION
519	TWEEDY	BIRD	2	TERRY KIM	APR 30/2002	20 - ANNUAL CHECK UP
					APR 30/2002	12 - EYE WASH

Identify the functional dependencies and show all the intermediate steps in normalizing the above relation upto third normal form. [8]

c) Explain multi valued dependencies and fourth normal form. [6]

Q6) a) Discuss query tree and query graph with respect to query optimization techniques. [6]

b) Suppose we have an available buffer space of 64 blocks and a file of 4096 blocks is to be sorted. How many posses will be needed in the merge phase of the external sort-merge algorithm. [4]

c) What is meant by the term heuristic optimisation? Discuss the main heuristics that are applied during query optimization. [10]

MODULE - IV

Q7) a) What is a schedule (history)? Define the concepts of recoverable, cascadeless and strict schedules. [8]

b) Discuss the wait-die and wound-wait protocols for deadlock prevention. [6]

c) Explain multiversion two phase locking using certified locks. [6]

Q8) a) With the help of an example explain ACID properties of a transaction. [8]

b) What is concurrency control? What are its objectives? [4]

c) With respect to two phase locking discuss : [2 x 4 = 8]

i) Basic two phase locking.

ii) Conservative two phase locking.

iii) Strict two phase locking.

iv) Rigorous two phase locking.

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