CSE & IT – 19PE

IV-B.Tech (Regular)
DBMS CS 402
(CSE, IT)

FOURTH SEMESTER EXAMINATION-2011

DATABASE MANAGEMENT SYSTEMS

[CS 402]

Full Marks: 60 Time: 3 Hours

Answer any SIX questions including Question No.1 which is compulsory.
The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable and all parts of a question should be answered at one place only.

1. a) Consider the relation schema R = (A, B, C, D, E) with the functional dependencies F= {A→{B,C}, B→{C,D}, {B,C}→{D, A,E}}. List the candidate keys for R? [2 × 10

   b) What does protecting and maintaining a database mean?

   c) Define self referential integrity constraint with suitable example?

   d) Every candidate key is a super key; but all the super keys are not candidate keys: - Justify?

   e) Discuss the importance of check point in transaction processing.

   f) What is the use of partial committed state in transaction processing?

   g) What is the use of Recovery log book in the transaction?

   h) Differentiate between primary index and clustering index?

i) Consider the following relation schema **BookRecords** as given below:-

BookId	Subject	Price
B101	DBMS	500
B102	OS	400
B103	DBMS	600

Find the output of the following query:

$\Pi_{\text{BookId, Subject}}(\text{BookRecords}) \bowtie \Pi_{\text{Subject, Price}}(\text{BookRecords})$

j) BCNF is treated to be stronger than 3NF, Justify.

2. a) Discuss the different types of constraints applicable to database system in brief? [5

b) Discuss the roles and responsibilities of DBA (Database Administrator). [3

3. a) Sailors(sid, sname, rating, age) [5
Boats(bid, bname, color)
Reserves(sid, bid, day)

By using the above relational schema, answer the following queries with the help of relational algebra or:

(i) Find the names of sailors who have reserved the boat 'b101'.
(ii) Find the details of the sailors who have reserved boats on '12-Feb-2011'.
(iii) Find the names of the sailors who have reserved all ***red*** boats.
(iv) Find the sailors' names who have reserved a green boat or their ratings are more than 10.
(v) Find the bname and color of the boats which are reserved by the sailors of 50 years.

b) Discuss the importance of self join with suitable example? [3

4. a) Draw an Entity-Relationship diagram to depict the information needs of the Engineering enterprise. [5

Each engineer works on a number of projects. For every engineer a record is kept of his/her employee number, name, title and salary. For every project a record is kept of its number, name, budget and location. Additionally, the responsibility each engineer has on a particular project and the amount of time spent on the project is noted. Clients contract these projects. The clients name, address and phone number must be recorded. The contract date, i.e. the date at which the client signs the contract for a specific project is also noted. A record is also kept of the machinery being used for a particular project. The name, amount and the date the machinery is needed for the project is recorded. The information regarding dependents of engineer like Date of birth, sex, name and relation should also be taken care. Include any additional attribute if necessary for drawing the ERT diagram.

b) Convert the above ER-model into relational model. [3

5. Consider the relation schema Project (Pid, Pcost, Pname, Prisk, Pmgr, Pduration) with the following functional dependency:
Pid, Pcost $\rightarrow$ Pname,
Pcost, Prisk $\rightarrow$ Pmgr,
Pmgr $\rightarrow$ Pduration
Pmgr $\rightarrow$ Prisk.

a) List the candidate keys for R. [2

b) Find the Normal form in which the relation is present? [1

c) Decompose the relation up to BCNF. [2

d) Justify the dependency preservation and lossless join decomposition properties for the above decomposition. [3

6. a) What do you mean by conflict Serializability of a schedule? Consider the given schedule consisting of two transactions T1 and T2 and explain whether the schedule is conflict serializable or not? [5

T1	T2
Read(X)	
X=X-N	
	Read(X)
	X=X+M
Write(X)	
Read(Y)	
	Write(X)
Y=Y+N	
Write(Y)	

b) How two-phase locking protocol helps in maintaining the concurrent execution of transaction processes. [3

7. a) What do you mean by canonical or minimal cover? Find the canonical cover of R= (X, Y, Z, W) with the set of functional dependencies F={X $\rightarrow$ {X, W, Y}, {X,W} $\rightarrow$ Z, Z $\rightarrow$ Y, {X, Y} $\rightarrow$ Z}. [5

b) What do you mean by concurrent execution of transactions? Discuss the problems arise due to it? [3

8. Write short notes on any two: [4 × 2

a) Multi-Valued Dependency

b) Timestamp-based Protocol

c) Constraints on Generalization/ Specialization.

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