CHAROTAR UNIVERSITY OF SCIENCE & TECHNOLOGY

Third Semester of B.Tech. Examination (CE/IT)

November 2013

IT 201 Database Management System

Date: 28.11.2013, Thursday **Time: 01:30 p.m. To 04:30 p.m.** **Maximum Marks: 70**

Instructions:

1. The question paper comprises of two sections.
2. Section I and II must be attempted in separate answer sheets.
3. Make suitable assumptions and draw neat figures wherever required.
4. Use of scientific calculator is allowed.

SECTION – I

Q - 1 (a) Draw and explain the structure of Database System. **[05]**

(b) Justify: "Data redundancy and inconsistency" is the disadvantage of file system over database system. **[02]**

Q - 2 (a) Construct an E-R diagram for university registrar's office which maintains following data. **[05]**

1) course including number, credit, syllabus
2) course offering including course number, year, sem, instructor
3) students including std_id, name, program
4) instructor including ins_id, name, dept, title

(b) What is the use of "Aggregation" in E-R model? Explain with suitable example. **[05]**

(c) Which are the different types of query languages in database system? Explain each in detail. **[04]**

OR

(b) What is weak entity set in E-R model? Explain with suitable example. **[05]**

(c) What is the need of 'Key' in database system? Differentiate Super key, Candidate Key and Primary key with example. **[04]**

Q - 3 (a) Suppose you are given a relation R = (A, B, C, D, E) with the following functional dependencies: F= {CE → D, D → B, C → A}. **[06]**

a. Find key attributes from above relation.

b. Check whether R is in 2NF? If no, covert R into 2NF.

(b) Give a relational algebra expression for below queries, **[05]**

Item (ino, description, unit price)

Supplier (sno, sname, address)

Supplied (sno, ino, sdate, quantity, per_unit_discount)

1) Find the item number having unit price greater than 1000.
2) List the supplier number and name along with supplied quantity.
3) Rename the relation item with new_item.
4) Display all the information about item which is supplied by the supplier.
5) List the total quantity for EACH item supplied.

(c) Find the canonical-cover / irreducible-set for following FD. [03]
Relation R = (A, B, C, D)
F = { A → BC, B → C, AB → D }

OR

(c) For Relation R = {A, B, C}, where F = { A → B , B → C }. Check whether following decompositions are lossless join decomposition or not. [03]
1) R1 = (A, B), R2 = (B, C)

SECTION – II

Q - 4 (a) Explain the basic steps for query processing in detail. [05]

(b) Define the shared-mode lock and exclusive-mode lock in concurrency control. [02]

Q - 5 (a) Draw and explain the state diagram of transaction in detail. [04]

(b) Write down the four cases of conflict serializability for swapping of two consecutive instructions. [04]

(c) Explain growing phase and shrinking phase of the two-phase locking protocol in detail with suitable example. [06]

OR

(c) What is deadlock in concurrency control? Explain techniques to prevent the deadlock. [06]

Q - 6 (a) Consider the below schedule, [04]

T1	T2
R(A)	
W(A)	
	R(A)
	W(A)
R(B)	
W(B)	
	R(B)
	W(B)

1) Using precedence graph, check whether above schedule is conflict serializable or not.
2) If above schedule is conflict serializable than make equivalent serial schedule for that.

(b) Define the following terms of database system: [04]
1) Starvation
2) Domain
3) View
4) Recoverable schedules

(c) Explain the types of errors that cause transaction failure. Explain the recovery system of database. [06]

OR

(c) Explain discretionary access control and mandatory access control in database security. [06]

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