

ALCCS - (NEW SCHEME)

Code: CT13
Time: 3 Hours

Subject: DATABASE MANAGEMENT SYSTEMS
Max. Marks: 100

MARCH 2011

NOTE:

- Question 1 is compulsory and carries 28 marks. Answer any FOUR questions from the rest. Marks are indicated against each question.
- Parts of a question should be answered at the same place.

- Q.1
- Discuss the advantages of Database Management System over file system.
 - Discuss the roles of a database administrator.
 - Define entity, entity set, relationship and relationship set.
 - What is Functional Dependency? Differentiate between full functional dependency and partial functional dependency.
 - Discuss recoverable and cascadeless schedules with the help of an example.
 - State 3NF. Decompose the relation SUPPLIER (SNAME, STREET, CITY, STATE, TAX) into 3NF relations for the given set of functional dependencies.
SNAME → STREET, CITY, STATE,
STATE → TAX,
SNAME → STATE → TAX
 - Differentiate between Tuple Relational Calculus and Domain Relational Calculus. (7 × 4)

- Q.2
- For the following problem definition:
A company database needs to store information about employees (identified by ssn, with salary and phone as attributes); departments (identified by dno, with dname and budget as attributes); and children of employees (with name and age as attributes). Employees work in departments; each department is managed by an employee; a child must be identified uniquely by name when the parent (who is an employee; assume that only one parent works for the company) is known. The information about a child is not required once the parent leaves the company.

- Draw an E-R diagram. (9)
- Map the E-R diagram into relational model. (9)

- Q.3
- Consider the following relations with key underlined
Customer (C#, Cname, Address)
Item (I#, Iname, Price, Weight)
Order (O#, C#, I#, Quantity)
Write SQL queries for the following:

- (i) List the names of customers who have ordered items weighing more than 1000.
(ii) List the names of customers who have ordered atleast one item priced over Rs.500.
(iii) List the customers who have ordered the same item as the customer named 'John'.
(iv) Create a view called "orders" that has the total cost of every order. (12)
- b. What are the basic operations in Relational Algebra? Explain various joins in relational algebra with the help of suitable examples. (6)
- Q.4** a. Consider the following relation schema with primary keys underlined
Project(P_No, P_Name, P_Incharge)
Employee(E_No, E_Name)
Assigned_to(P_No, E_No)
Write the relational algebra expression for the following:
(i) List details of employees who are working on all the projects.
(ii) List E_No of employees who are not working on project number 2K.
(iii) List the names of employees who are working in the same project as employee named 'Tom'.
(iv) List the names of employees who are not working in any project. (12)
- b. Differentiate between Conflict Serializability and View Serializability of schedules. (6)
- Q.5** a. For the relation R with attributes A, B, C, D, and set of FDs. $F = \{A \rightarrow BC, B \rightarrow C, A \rightarrow B, AB \rightarrow C, AC \rightarrow D\}$. Compute the canonical cover of F. (9)
- b. What is shadow page recovery scheme? How does it compare with the log-based recovery techniques in terms of ease of implementation and overhead costs? (9)
- Q.6** a. Discuss deferred database modification. What are its advantages? (6)
- b. Discuss ACID properties of a transaction. (6)
- c. Discuss the relative advantages of centralized and distributed databases. (6)
- Q.7** Write short notes on any **THREE** of the following:
(i) Granularity of data items.
(ii) Multivalued Dependency and 4NF.
(iii) Join Dependency and 5NF.
(iv) Web Databases. (6+6+6)