

M.Sc. (INFORMATICS) / III Semester 2016
PAPER IT-32-Database Management Systems

Max Marks: 75

TIME: 03 hours

(Write your Roll No. on the top immediately on receipt of this question paper)

(Answer Question Number 6 and any 4 from the rest)

Q1

- a) What are the main advantages of using a DBMS? In which situations we shouldn't use DBMS? 5
b) Briefly explain "Natural Join Operation" with an example. 4
c) What is data redundancy? What are the disadvantages of having redundancy? 3
d) Distinguish between *Superkey*, *Key* and *Candidate key* with examples 3

Q2 a) Construct an E-R diagram for a hospital with following details

- It will maintain information about all Departments like Department name, Contact no, Head of Department (Department may have multiple contact nos)
- Information about Doctors like Name, Address, Specialization, Designation, Contact No, Department
- Information about Patients like Name, Age, Sex, Date of admission, Date of discharge, Disease, Test Results, Address, Contact No (Patients may undergo multiple tests)
- It will maintain information about all tests that are done in hospital like Test Name, Test result, Concerned doctor and Concerned patients

The System would record the checkup date of patient by doctors, test dates etc.
Specify entities, relationship, constraints, assumptions clearly

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- b) Explain with suitable examples how would you make a design choice between attribute and relationship and Weak Entity versus composite multi-valued attributes 5

Q3 a) Explain with suitable examples how various OUTER JOIN operations are different from INNER JOIN operations 5

- b) Consider the following relational database schema

Book(Book_id, Title, Publisher_name)
Authors(Book_id, Author_name)
Publisher(Name, Address, Phone)
Book_Copies(Book_id, Branch_id, No_of_Copies)
Book_Loans(Book_id, Branch_id, Card_no, Date_Out, Due_Date)
Library_Branch(Branch_id, Branch_name, Address)
Borrower(Card_no, Name, Address, Phone)

Write SQL queries/Relational Algebra expressions for the following?

[2*5]

- Retrieve all the borrowers who don't have any books checked out
- How many copies of book titled 'Database Systems' are owned by each library branch
- For each library branch, retrieve the branch name and total no of books loaned out
- For each book whose due date is today, retrieve branch name, book title, borrower's name and address
- Retrieve the name, addresses and number of books checked out for all borrowers who have more than three books checked out

Q4)

- a) What do you understand by Relational Model constraints? Name the constraints and state the reason why these constraints are required. 3
- b) Describe the concept of cursor and what operations can be performed on cursor. How it is used in embedded SQL with suitable examples. 6
- c) What are the conditions to be fulfilled for two relations to be involved in a UNION operation? 3
- d) Write SQL statement for the following
 - i. Change the column C of a table ABC to now accept default value 9999
 - ii. Delete a table from the database
 - iii. Delete column C from table ABC

Q5) Consider the following relational database schema

Employee(Ssn, Name, Bdate, Address, Sex, Salary, Super_Ssn, Dno)Department(Dnumber, Dname, Manager_Ssn)Project(Pnumber, Pname, Control_Dnum)Works_On(ESsn, Pnumber, Hours_Per_Week)

- a) Write SQL queries for the following [2*5]
 - i. Update the salary of all female employees of department number 5 by 20%
 - ii. List all the employees who are not working in any project
 - iii. Find all the departments id, name, managers for which more than 100 employees are working
 - iv. Retrieve the names of all employees whose supervisor's supervisor has 5001 as Ssn
 - v. Retrieve the names of all employees who work in the department that has employee with the highest salary among all the employees
- b) What are the reasons for defining a view? [2+3]
Write SQL statement for Creating a view that has project name, controlling department name, number of employees and total hours worked per week on the project for each project

Q6) Write short notes on (any five) with suitable examples [3*5]

- a) 3NF/BCNF
- b) Distributed Database Systems
- c) Weak Entity Sets
- d) Threats to Databases
- e) Data Integrity
- f) Materialised Views