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INTERNATIONAL CENTRE FOR APPLIED SCIENCES

(Manipal University)

IV SEMESTER B.S. DEGREE EXAMINATION – APRIL / MAY 2017

SUBJECT: DATABASE MANAGEMENT SYSTEM (CS 246)

(BRANCH: CS)

Saturday, 29 April 2017

Time:3 Hours **Max. Marks: 100**

- ✓ **Answer any FIVE full questions.**
- ✓ **Missing data, if any, may be suitably assumed**

1A. You are appointed as the admin of the Data Repository of 'ABC 'company where the information of the employees is stored and maintained using file processing system. Can you explain the drawbacks of such a system to your higher authority to replace it with DBMS by giving suitable justification and the examples?

1B. Consider the relational schema Instructor= (id, name , branch, salary) ,
student =(reg_no, stu_name, DOB, age, mobile_no).

a. Draw an ER diagram where an instructors takes class to students

b. Explain using this relational schema the different possible ways to associate instructor(s) and student(s) in to takes relationship.

1C. What are the types of attributes used in ER model. Explain with an example for each of the types. **(7+7+6)**

2A. Consider the following relational schema for a college which has a separate department for each of the courses it offers:

Student(RegNo, Name, Address, gender,DName, Semester)

Department(DName, HOD, Location)

Faculty(FId, FName, Designation, Salary, DName)

Subject(SId, SName, DName, Credits, Semester)

Handle (FId, SId)

Write the SQL queries to list the following:

i. All subjects which belong to 'CSE' Departments.

ii. Subjects whose name begins with 'database'.

iii. Names of the faculty who don't handle any subject.

iv. Students names whose BirthDate is missing

v. Departments where the average faculty salary is greater than the average faculty salary of all the departments

2B. Consider a relational database given below :

Employee(person_name, street, city)

Works(person_name, company_name, salary)

Company(company_name, city)

Manager(person_name, manager_name)

Write relational algebraic expressions for the following queries

i. Find the names of all employees who work for First Bank Corporation.

ii. Find the names and cities of residence of all employees who work for First Bank Corporation.

iii. Find the names, street address, and cities of residence of all employees who work for First Bank Corporation and earn more than $10,000 per annum.

iv. Find the names of all employees in this database who live in the same city as the company for which they work.

v. Find the names of all employees who live in the same city and on the same street as do their managers. **(10+10)**

3A. Consider the relation R (A, B, C, D, E,F) with the functional dependencies
F = {A → C, C → D, D → B, E → F}
(i) Find all the candidate keys of R.
(ii) Is R in BCNF? If not, then decompose it into BCNF.

3B. Write an algorithm for finding canonical cover and hence find the same for the following given R=(ABC) and a set of functional dependencies F = {A → BC, B →C, A →B, AB →C,AC→B}. **(10+10)**

4A. Define transaction. With diagram list and explain various states of transaction.

4B. What is a schedule? Create a concurrent schedule which includes two transactions where T1 transfers Rs 1000 from account A to account B and transaction T2 transfers 10% of A's amount to B with the initial value of A=Rs 3000 and B=Rs 4000.

4C. When do you say that the concurrent schedule has its equivalent conflict serializable? Explain with help od an example. **(7+7+6)**

5A. Give storage device hierarchy structure. Explain each storage media used in it.

5B. Give the extendable hash structure on a file that contains 10 records with the following search key values 2, 3, 5, 7, 11, 17, 19, 23, 29, 31. The hash function is computed as h(x)=x mod 8 and the buckets can hold three records. Show the extendable hash structure and also the structure after each operation.
i) delete 11 ii) insert 1 **(8+12)**

6A. With a suitable example list and explain join types and conditions used in SQL.

6B. When do you say that the given relation is in 3NF? Write and explain the 3NF decomposition algorithm

6C. Explain the elevator algorithm used to improve the speed of block access. **(7+7+6)**

7A. With an appropriate example(s) explain the E-R design issues.

7B. Construct a B+-tree for the following set of key values: (12, 13, 15, 17, 111, 117, 119, 123,1 29, 131). Assume that the tree is initially empty and values are added in ascending order with each node having four pointers. **(10+10)**

8A. Give a procedure to compute the join between the two relations in the following SQL query and also explain how Least Recently Used (LRU) and Most Recently Used (MRU) strategies work.

"***select * from instructor natural join department***".

8B. When do you say that the schedule is cascading rollback? Expain the same with help of an example.

8C. Explain the shadow-copy scheme that is used in maintaining the atomicity of a transaction.

(8+6+6)