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INTERNATIONAL CENTRE FOR APPLIED SCIENCES

(Manipal University)

IV SEMESTER B.S. DEGREE EXAMINATION – OCT. / NOV. 2017

SUBJECT: DATABASE MANAGEMENT SYSTEM (CS 246)

(BRANCH: CS)

Tuesday, 07 November 2017

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

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

1A. What are the applications of Database Management Systems. ?

1B. With a neat diagram and an example , explain the concept of data abstraction.

1C. Discuss data redundancy, atomicity, integrity and concurrent access problems in a traditional file processing system. (6+7+7)

2A. What is view? How view(s) is/are created? In which case the view is updatable? Explain with suitable example.

2B Draw a ER diagram for the below given college database.
Give the information about the college as: A college contains many departments. Each department can offer any number of courses. Many instructors can work in a department. An instructor can work only in one department. For each department there is a Head .An instructor can be head of only one department. Each instructor can take any number of courses. A course can be taken by only one instructor. A student can enroll for any number of courses. Each course can have any number of students.

2C. How do you translate the ER diagram to its equivalent relational schema? Explain with example. (6+7+7)

3A. Consider the relational schema given as : Student(reg_no_, name , Branch , gender) and marks(reg_no(references to reg_no of student table) , sub1_mark, sub2_marks, sub3_marks ,total). Answer the below given queries using SQL

(i) Find the names of those students who are the topers in each branch.

(ii) Increase the total of those students whose total is <45 by 5%, <50 and >=45 by 3% and rest by 2%. Use single update statement.

(iii)Remove the students whose total is less than 30 from the DB.

(iv)List the names of the students who have attempted second subject (sub2_marks) more than 3 times and total is less than 40.

(v) List the name(s) of all departments whose total marks is > the average marks of all students.

3B. What is RAID? Explain Raid leavel0 and Raid leavel1. (12+8)

4A. Consider the following schema :

Employee(Fname, Mname, Lname, Essn, bdate, address, salary, Dnumber)

Department(Dname, Dnumber, Mgr_ssn ,Mgr_start_date)

Dependent(Essn,Dependent_name, gender, Relationship)

write relational algebra expressions for the following questions:

i. Find the Fname and Lname of managers of each department.

ii. Retrieve the Fname, Lname and address of all employees who work for the 'Research' department.

iii. Retrieve the details of employees who have more than two dependents.

iv. Find all employees who work in Dnumber 6 and have salary >80000

v. Find the average salary of employees in each department

4B. Give a procedure to find a candidate key. Find all possible candidate key for given relational schema R=(ABCDEG) and set of functional dependences F = {AB → CD, A → B, B → C, C →E, BD → A}. (10+10)

5A. Let R(A, B, C, D, E, F, G), F={AB →CD, C →EF, G →A, G→F, CE →F} check whether the given relation is in 3NF or not. If not decompose it into 3NF, Where the candidate keys are ABG and BCG.

5B. When do you say that a concurrent schedule has its equivalent conflict serial schedule. Check where the given schedule in Fig 5B. has equivalent conflict serial schedule or not.

Schedule	
T1	T2
Read(A)	
write(A)	
	Read(A)
	Write(A)
Read(B)	
write(B)	
	Read(A)
	Write(B)

Fig 5B.

5C. List and explain the properties of transaction. (8+8+4)

6A. Suppose that we are using extendable hashing on a file that contains records with the following search-key values: 2, 3, 5, 7, 11, 17, 19, 23, 29, 31. Show the extendable hash structure for this file if the hash function is h(x) = x mod 8 and buckets can hold three records.

6B. Write Boyce Code Normal form and its decomposition algorithm. (12+8)

7A. With an example for each explain any two types of ordered indices used in indexing.

7B. Explain two most common tertiary storage media.

7C. Explain the constraints used on generalization/specialization. (7+7+6)

8A. What is the schema diagram? Draw a schema diagram for the below given database.
branch (branch_name, branch_city, assets);customer (customer_name, customer_street, customer_city)
loan (loan_number, branch_name, amount); borrower (customer_name, loan_number)
account (account_number, branch_name, balance); depositor (customer_name, account_number)

8B. Write the conditions to check for 4NF. Give 4NF decomposition algorithm.

8C. Explain the shadow-copy scheme that is used in maintaining the atomicity of a transaction. (7+7+6)