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Thapar Institute of Engineering & Technology, Patiala
Computer Science and Engineering Department
Auxiliary Examination, August-2024

B. E. (Second Year): Semester-II (2023-24)	Course Code: UCM003
(Minor CSE)	Course Name: Database Management System
22 August, 2024	Time: 5.30 PM-8.30 PM
M. Marks: 50	Name of Faculty: Dr. Rajendra Ku. Roul

(Note: Assume the missing information (if any) suitably. All the symbols used here have their usual meaning.)

Q1. Explain the following with examples: (5 x 2 = 10M)

- a) File system vs. Database system
- b) Unique key vs. Primary key
- c) DDL commands vs. DML commands
- d) Composite attributes vs. multi-value attributes
- e) Delete vs. Truncate

Q2. Consider the following schedule S with four transactions T1, T2, T3, and T4.

T1	T2	T3	T4
			Read(x)
			Read(p)
			Commit
	Read(x)		
		Read(x)	
Write(y)			
Commit			
	Write(x)		
		Read(y)	
		Write(y)	
	Write(y)		
	Commit		
		Read(z)	
		Write(z)	
		Commit	

- i) State whether S is conflict serializable or not by using precedence graph. **2M**
- ii) If S is conflict serializable then determine all the possible serializable schedules. **2M**
- iii) State whether S is cascadeless or not with proper reason. **2M**
- iv) State whether S is strict schedule or not with proper reason. **2M**
- v) State whether S is recoverable or not with proper reason. **2M**

Q3. Answer the following Questions on PL/SQL.

(5 x 2 = 10M)

- a) Write a local function that will accept a number as an input, compute its factorial, and send it to the main block for printing.
- b) Write a stored procedure that will accept a number, check whether positive, negative or zero and accordingly print the message.
- c) Write a stored function that will find the sum of elements from 1 to n and send the result to the main block. 'n' should send as the input to the called function.
- d) Write a pl/sql code using cursor, which will delete all those records from the Student table where age < 25
- e) What is the difference between row level and statement level triggers. Give example of each.

Q4. Consider, a university contains many departments. Each department can offer any number of courses. Many teachers can work in a department. A teacher can work only in one department. For each department there is a Head. A teacher can be head of only one department. Each teacher can take any number of courses. A student can enroll for any number of courses. Each course can have any number of students.

- a) Discuss different symbols in Entity-relationship (ER) with example. **5M**
- b) Draw the ER diagram for the above University management system. **5M**

Q5. Given the following four relational schemas, and answer the following SQL queries. (*Note: No partial marking will be considered for any of the SQL queries.*) **(5 x 2 = 10M)**

Employee (ssn: integer, fname: string, lname: string, bdate: date, Address: string, salary: integer, supervisor_ssn: integer, dno: integer), where supervisor_ssn is the self-referential foreign key and dno is the foreign key referencing to Department.

Department (dno: integer, dname: string, Mgr_ssn: integer, Mgr_start: date), where dname has unique constraint and Mgr_ssn is the foreign key referencing to Employee.

Project (pno: integer, pname: string, plocation: string, dno: integer), where pname has unique constraint and dno is the foreign key referencing to Department.

Works_on (essn: integer, pno: integer, hours: time), where essn is the foreign key referencing to Employee and pno is the foreign key referencing to Project.

- (i) Find the average salary of those employees who work on the projects managed by their own department's manager.
- (ii) Find the total number of hours worked by employees on projects managed by supervisors with a salary higher than \$100,000.
- (iii) Find the departments where the average employee salary is greater than the average salary of departments managed by supervisors with a salary greater than \$80,000.
- (iv) List the names of projects with at least one employee who works more than 40 hours on that project.
- (v) List the names of employees who work on more than one project.
