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Thapar Institute of Engineering & Technology, Patiala
Department of Computer Science & Engineering
Auxiliary Examination

B.E (Second Year): Semester- IV	Course Code:UCS310 Course Name: Database Management System
31 August, 2023, 5.30-8.30 PM Time: 3 Hours, Max Marks:100	Name of Faculty: Dr. Geeta Kasana

Note: All questions are compulsory and attempt all parts of a question at one place. Assume missing data, if any, suitably. Clearly specify your assumptions, if any.

Q.1 a)	<p>Alice has a large DVD movie collection. Her friends like to borrow her DVD's, and she needs a way to keep track of who has what. She maintains a list of friends, identified by unique FID's (friend identifiers) and a list of DVD's, identified by DAVID's (DVD identifiers). With each friend is the name and the all-important telephone numbers which she can call to get the DVD back. With each DVD is the star actor name and title. Whenever a friend borrows a DVD, Alice will enter that fact into her database along with the date borrowed. Whenever the DVD gets returned, that fact, too, gets noted along with the date returned. Alice wants to keep a complete history of her friends' borrowing habits so that she can ask favors of the heavy borrowers (or perhaps refuse to make further loans to those who habitually don't return them quickly). Below is an E-R diagram for a database to help Alice out.</p> <p>I. Provide appropriate names for:</p> <ol style="list-style-type: none"> Entities E1, E2; attributes A1, A2, A3, A4, A5; Multi-value attribute A6; relationship R1; cardinality constraint C1min, C1max, C2min and C2max; <p>II. Design the database based on your final ER Model. Justify your answer.</p>	10
Q1(b)	<ol style="list-style-type: none"> Differentiate between Logical independence and Physical data independence Differentiate between the usage of inner Join and outer Join with suitable examples. 	10
Q2(a)	Draw a database architecture diagram and describe how DBMS modules and components interact with each other.	10
Q2(b)	<p>Given a relational Schema $R(W, X, Y, Z)$ and set of Function Dependencies.</p> <p>$FD = \{ W \rightarrow X, Y \rightarrow X, Z \rightarrow WXY, WY \rightarrow Z \}$. Find the canonical cover?</p>	10
Q3(a)	<ol style="list-style-type: none"> What is "Two-Phase locking protocol"? Explain with the help of example of a schedule, how the protocol ensures a schedule to be conflict-serializable, but not Cascade-less? Discuss the ACID Properties. 	5+5
Q3(a)	Consider the schedule for transactions T1, T2, T3 and T4 and test schedule conflict-serializable and recoverable or not, write the explanation about why or why not?	10

	<table border="1"> <tr> <th>T1</th> <th>T2</th> <th>T3</th> <th>T4</th> </tr> <tr> <td>Writes(X) Commit</td> <td>Reads(X) Writes(Y) Reads(Z) Commit</td> <td>Writes(X) Commit</td> <td>Reads(X) Reads(Y) Commit</td> </tr> </table>	T1	T2	T3	T4	Writes(X) Commit	Reads(X) Writes(Y) Reads(Z) Commit	Writes(X) Commit	Reads(X) Reads(Y) Commit	
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Q4(a)	Why do we need normalization? Discuss the different normal forms with examples.	10								
Q4(b)	<p>Write the SQL statements to answer the given queries using following relations of a book club</p> <p>Members(Member_id,Name,Designation,Age)</p> <p>Books(book_id,Book_title,Book_author , Book_Publisher , Book_price)</p> <p>Reserves(Member_id, Book_id, Date)</p> <p>i) Find the names of members who are professors and older than 45.</p> <p>ii) List the titles of books reserved by professors.</p> <p>iii) Find IDs of members who have not reserved books that cost more than Rs 500.</p> <p>iv) Find the authors and titles of books reserved on 27-may-2007</p>	10								
Q5(a)	<p>Consider the following database:</p> <p>Employee(eno,ename, job, branch_id)</p> <p>Branch(branch_id, branch_name)</p> <p>Write the PL/SQL code to perform following operations:</p> <p>i) Write a function that Accept the branch number and calculate the number of employees in that branch and finally return the number of employees.</p> <p>ii) Write a procedure that accept the branch number from already created function and return the count of employees for the branch number accepted. Also, If employee count is less than 2 then delete the employees belonging to that branch followed by deleting the branch.</p>	10								
Q5(b)	<p>The bank manager of Thapar University branch decides to activate all those accounts, which were previously marked as inactive for performing no transactions in last 365 days.</p> <p>Write a PL/SQL block to update the status of accounts. Display an appropriate message based on the number of rows affected by the update fired.</p> <p>Consider following database to perform given task:</p> <p>Account_Master (Account_number, Status, Balance, Branch_Number)</p> <p>Branch (Branch_Number, Name)</p>	5								
Q5(c)	Write a cursor to calculate the total salary of first n records of emp table having columns empno, ename, salary. The value of n is passed to cursor as parameter.	5								

*****All The Best*****