Roll Number:_____

Thapar Institute of Engineering and Technology Patiala
Computer Science and Engineering Department
End Sem Test

BE Second Year (4ᵗʰ Semester) 27th May, 2022	UCS310: Database Management System
Time: 2 Hours, Max Marks:35	Coordinaors: Dr Geeta Kasana, Dr.Anshu Parashar
Instructors: Geeta Kasana, Anshu Parashar, Sanjeev Rao, Sumana Maiti, Rajendra Roul, Varun Srivastav, Manisha Kaushal, Diwakar Tripathi	

Note: Attempt all parts of a question and answer them in order. A new question must start from new page. Assume any missing data.

Q1	a) Given a relation **Student** (*Name, ID, Age, Address, City*) and Functional Dependency set FD = {ID, Age → Name Address City, Address → City}, determine given relation Student is in which normal form (check up to BCNF)? Also consider that all attributes are single valued. Show all steps of decomposition upto BCNF. b) Find the canonical cover for the following set of functional dependencies {B→D, BD→E, F→J, F→BE}	4+3

Q2	a) 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?
	
	b) Consider a database with objects X and Y and assume that there are two transactions T1 and T2. Transaction T1 reads objects X and Y and then writes object X. Transaction T2 reads objects X and Y and then writes objects X and Y.
	
	   i. Give an example schedule with actions of transactions T1 and T2 on objects X and Y that results in a write-read conflict.
	
	   ii. Give an example schedule with actions of transactions T1 and T2 on objects X and Y that results in a read-write conflict.
	
	   iii. Give an example schedule with actions of transactions T1 and T2 on objects X and Y that results in a write-write conflict.
		4+3

Q3	a) What do you mean by Concurrency? Why concurrency control is required discuss with suitable examples? b) Consider the following schedules involving two transactions. $S_1 : r_1(X) ; r_1(Y) ; r_2(X) ; r_2(Y) ; w_2(Y) ; w_1(X)$ $S2 : r_1(X) ; r_2(X) ; r_2(Y) ; w_2(Y) ; r_1(Y) ; w_1(X)$ Which one of the above schedules are conflict serializable and why?	5+2
Q4	a) Create a local function to call a stored function which is used to display the salary of an employee from table **EMP** (*Emp_id, Salary*) whose employee id is passed as an argument. Also handle the exception when employee id does no found. b) Discuss the different types of anomalies with suitable example.	4+3

P.T.O

Q5		5+2

a) Consider a table named **EMP** (*Emp_id number, Basic_pay number, DA number, HRA number, Total number)*, having data values for *Emp_id and Basic Pay* only and other attributes *DA, HRA* and *Total* attributes are set NULL for each record as shown below in Input table. You have to write a PL/SQL code to update the *DA* (50% of Basic pay), *HRA* (20% of Basic pay) and *Total* salary of each employee by adding *Basic_ pay, DA and HRA* in the **EMP** table except for a particular employee whose *Emp_id* (eg: *Emp_id*= 3) will be pass by calling a local procedure using parameterized cursor. Output of the code should be similar to as shown in table named Output Table.

Input Table

Emp_id	Basic_Pay	DA	HRA	Total
1	100	Null	Null	Null
2	200	Null	Null	Null
3	300	Null	Null	Null
4	400	Null	Null	Null
5	450	Null	Null	Null

Output Table

Emp_id	Basic_Pay	DA	HRA	Total
1	100	50	20	170
2	200	100	40	340
3	300	Null	Null	Null
4	400	200	80	680
5	450	225	90	765

b) Write a PL/SQL code to create a row-level trigger for **EMP(*Emp_Id(primary_key), Name, Age, salary, commision*)** table which computes the commission of every new employee belonging to department "CS" before a record for that employee is inserted into the **EMP** table.

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Thapar Institute of Engineering and Technology Patiala
EST QUIZ

BE Second Year (4th Semester) 27 May, 2022   UCS310: Database Management System
Time: 10 Minutes   MM :10
NOTE: Assume any missing data. Overwriting answer will be marked as zero.

1.	The phenomenon, in which a single transaction failure leads to a series of transaction rollbacks, is called _____.
	   a) Cascading rollback
	   b) Uncommitted rollback
	   c) Conflict rollback
	   d) Topological rollback	

2.	The :OLD and :NEW qualifiers can be used in which type of trigger? a) Row level DML trigger b) Row level system trigger c) Row level application trigger d) Statement level system trigger	

3	Consider the following two-phase locking protocol. Suppose a transaction T accesses (for read or write operations), a certain set of objects $\{O_1,...,O_k\}$. This is done in the following manner:
	
	Step 1. T acquires exclusive locks to $O_1, \ldots, O_k$ in increasing order of their addresses.
	 Step 2. The required operations are performed.
	Step 3. All locks are released.
	This protocol will
	   a) guarantee serializability and deadlock-free
	   b) guarantee neither serializability nor deadlock-free
	   c) guarantee serializability but not deadlock-free
	   d) guarantee deadlock-free but not serializability	

4	The relational schema **Student_Performance (*name, course_no, roll_no, grade*)** has the following functional dependencies: name, course_no → grade roll_no, course_no → grade name → roll_no roll_no → name The highest normal form of this relational schema is a) 2NF b) 3NF c) BCNF d) 4NF	
5	Which of the following is a valid implicit cursor attribute? a) SQL%OPEN b) SQL%NODATAFOUND c) SQL%ROWTYPE d) SQL%ROWCOUNT	
6	What happens after the completion of the exception handler block? a) The control gets transferred to the last statement of last available block. b) The control is transferred to the next statement of the enclosing exception handler block. c) The program simply exits. d) Control is transferred to the last statement of the currently running block.	

P. T. O

7	Which of the following is not correct?
	    a) 2NF and 3NF are based on functional dependencies.
	    b) Both BCNF and 4NF are based on multivalued dependencies.
	    c) 5 NF is based on join dependencies.
	    d) 1NF is based on the structure of data	

8	Consider a relation R (M, N, O, P) with two sets of functional dependencies.
	
	 FD1: {M→N, N→O, M→O} and FD2 = {M→N, N→O, M→P}
	 Which of the following is true?
	    a) These two FDs are equivalent
	    b) These are not equivalent
	    c) Data insufficient to determine equivalence
	    d) None of these	

9	The relation **EMPDT1** is defined with attributes{*empcode(unique), name, street, city, state, and pincode*}. For any *pincode*, there is only one *city* and *state*. Also, for any given *street, city* and *state*, there is just one *pincode*. From the question we get the FDs as below: pincode → city, state street,city,state →pincode In normalization terms **EMPDT1** is a relation in (a) 1NF only (b) 2NF and hence also in 1NF (c) 3NF and hence also in 2NF and 1NF (d) BCNF and hence also in 3NF, 2NF and 1NF	

10	What will be the output of the below code?
	
	 ```DECLARE```
	```customer_id NUMBER(9) := 678;```
	```credit_limit NUMBER(10,2) := 10000;```
	```BEGIN```
	``` DECLARE```
	``` customer_id VARCHAR2(9) := '3332';```
	``` current_balance NUMBER(10,2) := 467.87;```
	``` BEGIN```
	``` dbms_output.put_line('The value of customer_id='|| customer_id);```
	``` END;```
	```END;```
	
	   a) 678 b) 3332 c) 6783332 d) None of these	

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