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Reg. No. : | | | | | | | | | | |

Question Paper Code: 53206

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2019

Third Semester

Computer Science and Engineering

15UCS306 – DATABASE SYSTEM CONCEPTS

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. Department (dept name, building, budget) and Employee (employee_id, name, dept name, salary) Here the dept_name attribute appears in both the relations. Here using common attributes in relation schema is one way of relating _____ relations. CO1- R

   (a) Attributes of Common (b) Tuple of common

   (c) Tuple of distinct (d) Attributes of distinct

2. Which forms has a relation that possesses data about an individual entity: CO2- R

   (a) 2NF (b) 3NF (c) 4NF (d) 5NF

3. Which of the following protocols ensures conflict serializability and safety from deadlocks? CO3- R

   (a) Two-phase locking protocol (b) Time-stamp ordering protocol

   (c) Graph based protocol (d) None of the mentioned

4. The RAID level which mirroring is done along with stripping is CO4- R

   (a) RAID 1+0 (b) RAID 0 (c) RAID 2 (d) Both RAID 1+0 and RAID 0

5. Which is a join condition contains an equality operator: CO5- R

   (a) Equijoins (b) Cartesian

   (c) Both Equijoins and Cartesian (d) None of the mentioned

PART – B (5 x 3= 15 Marks)

6. Consider the following relational database : CO1- R

employee (employee-name, street, city)
works (employee-name, company-name, salary)
company (company-name, city)
manages (employee-name, manager-name)

Give an SQL DDL definition of this database. Identify referential-integrity constraints that should hold, and include them in the DDL definition.

7. Write an assertion for the banking database to ensure that the assets value for the Coimbaore branch is equal to the sum of all the amounts lent by the Coimbatore branch. CO2- R

8. Explain how the issues of atomicity and durability are relevant to the creation and deletion of files, and to writing data to files. CO3- R

9. State the differences between primary index and secondary index CO4- R

10. What are the advantages and disadvantages of hash indices relative to B^+-tree indices? CO5- R

PART – C (5 x 16= 80 Marks)

11. (a) Develop a ER Model for a vehicle insurance company whose customers own one or more vehicles each. Each vehicle has associated with it zero to any number of recorded accidents. Each insurance policy covers a maximum of two vehicles, and payment associated with it. Payment of insurance is for a period of two years and has associated due date. CO1- App (16)

Or

(b) Consider the following 'banking' database. Write Relational Algebraic Expressions for the given queries. CO1- App (16)

Customer(customer_id, person_name, street, city)
Works (customer_id, company_name, deposit)
Company (company_name, city)
Manages (customer_id, manager_name)

1. Find all customers in the database who deposit more than each customer of "ABC Bank".
2. Assume that the bank may be located in several cities. Find all branches located in every city in which "ABC Bank" is located.
3. Find the bank that has the most customers.
4. Find those banks whose customers deposit a higher amount, on average, than the average deposits at "ABC Bank".

12. (a) Let R = (A,B) and S = (A,C), and let r(R) and s(S) be relations. Write an expression in SQL for each of the queries below: CO2- App (16)

a. $\{< a > \mid \exists\, b\ (<a,b> \in r \wedge b = 17)\}$

b. $\{< a, b, c > \mid <a,b> \in r \wedge <a,c> \in s\}$

c. $\{< a > \mid \exists\, c\ (<a,c> \in s \wedge \exists b_1, b_2\ (< a,b_1> \in r \wedge < c, b_2> \in r \wedge b_1 > b_2))\}$

Or

(b) Define BCNF .How does it differ from 3NF. CO2- App (16)

13. (a) Suppose that we decompose the schema R = (A, B, C, D, E) into CO3- Ana (16)

(A, B, C)

(A, D, E)

a. Show that this decomposition is a lossless-join decomposition if the following

set F of functional dependencies holds:

$A \rightarrow BC$

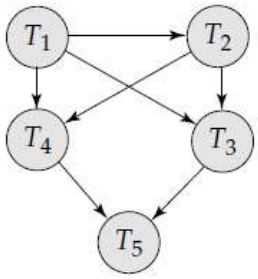
$CD \rightarrow E$

$B \rightarrow D$

$E \rightarrow A$

Or

(b) Consider the precedence graph in the following figure. Is the corresponding schedule conflict serializable? Explain your answer. CO3- Ana (16)



14. (a) Construct a B^+-tree for the following set of key values: CO4- U (16)

(2, 3, 5, 7, 11, 17, 19, 23, 29, 31)

Assume that the tree is initially empty and values are added in ascending order. Construct B^+-trees for the cases where the number of pointers that will fit in one node is as follows:

(a) Four

(b) Six

(c) Eight

Or

(b) Explain optimization of Disk block access. CO4- U (16)

15. (a) Elucidate aggregation operations with a neat example CO5- U (16)

Or

(b) Elucidate cost based optimization with a neat illustration CO5- U (16)