REV-01
BCA/02/07

2023/12

SET A

BACHELOR OF COMPUTER APPLICATION
THIRD SEMESTER (REPEAT)
RELATIONAL DATABASE MANAGEMENT SYSTEM
BCA-304

[USE OMR SHEET FOR OBJECTIVE PART]

Duration: 3 hrs. Full Marks: 70

Objective

Time: 30 mins. Marks: 20

Choose the correct answer from the following: *1×20=20*

1. Select operation in SQL is equivalent to:
   a. The selection operation in relational algebra
   b. The selection operation in relational algebra, except that select in SQL retains duplicates
   c. The projection operation in relational algebra
   d. The projection operation in relational algebra, except that select in SQL retains duplicates

2 Which of the following command is used to delete a table in SQL?
   a. delete
   b. truncate
   c. remove
   d. drop

3. "When buckets are full, a new bucket is allocated for the same hash result and is linked after the previous one."- is the concept of:
   a. Overflow Chaining
   b. Closed Hashing
   c. Both a & b
   d. Indexing

4. Consider a schema R(A, B, C, D) and functional dependencies A->B and C->D. Then the decomposition R1(A, B) and R2(C, D) is:
   a. Dependency preserving but not lossless join
   b. Dependency preserving and lossless join
   c. Lossless Join but not dependency preserving
   d. Lossless Join

5. DDL is provided for:
   a. Description of logical structure of database
   b. Addition of new structures in the database
   c. Manipulation & processing of database
   d. Description of physical structure of database system

6. Which of the following statements are TRUE about an SQL query?
   P : An SQL query can contain a HAVING clause even if it does not have a GROUP BY clause
   Q : An SQL query can contain a HAVING clause only if it has a GROUP BY clause
   R : All attributes used in the GROUP BY clause must appear in the SELECT clause
   S : Not all attributes used in the GROUP BY clause need to appear in the SELECT clause
   a. P and R
   b. P and S
   c. Q and R
   d. Q and S

7. Consider the relations r1(P, Q, R) and r2(R, S, T) with primary keys P and R respectively. The relation r1 contains 2000 tuples and r2 contains 2500 tuples. The maximum size of the join r1⋈ r2 is:
   a. 2000 b. 2500
   c. 4500 d. 5000

8. In an ER Diagram, derived attribute is represented by:
   a. Oval b. Dotted oval
   c. Dotted underline d. Solid underline

9. Which of the following is the recovery management technique in DBMS ?
   a. 2PC (Two Phase Commit) b. Backup
   c. Immediate update d. All of the above

10. SQL allows tuples in relations, and correspondingly defines the multiplicity of tuples in the result of joins. Which one of the following queries always gives the same answer as the nested query shown below:
    Select * from R where a in (select S.a from S);
    a. select R.* from R, S where R.a=S.a (D); b. select distinct R.* from R,S where R.a=S.a;
    c. select R.* from R,(select distinct a from S) as S1 where R.a=S1.a; d. select R.* from R,S where R.a=S.a and is unique R

11. A strong entity set with only simple attributes will require_____ number of table/s in a relational model.
    a. Two b. Three
    c. One d. Can't say

12. The SQL Expression-
    Select distinct T. branch name from branch T, branch S where T. assets > S. assets and S. branch-city = DELHI;
    finds the name of:
    a. All branches that have greater asset than any branch located in DELHI b. All branches that have greater assets than allocated in DELHI
    c. The branch that has the greatest asset in DELHI d. Any branch that has greater asset than any branch located in DELHI

13. A transaction can include following basic database access operations:
    a. Read_item(X) b. Write_item(X)
    c. Both a and b d. None of these

14. The dependency preservation decomposition is a property to decompose database schema D, in which each functional dependency X->Y specified in F:
    a. Appeared directly in one of the relation schemas Ri in the decomposed D b. Could be inferred from dependencies that appear in some Ri
    c. Both a and b d. None of these

15. A Transaction Manager is which of the following?
    a. Maintains a log of transactions b. Maintains before and after database images
    c. Maintains appropriate concurrency control d. All of the above

16. Which level of Abstraction describes what data are stored in the Database?
    a. Physical level
    b. View level
    c. Abstraction level
    d. Logical level

17. A hash table has space for 75 records, then the probability of collision before the table is 6% full.
    a. .25
    b. .20
    c. .35
    d. .30

18. The_____ is not a desirable property of transaction.
    a. Isolation
    b. Atomicity
    c. Durability
    d. Conditionality

19. A transaction cannot be rolled back if it is_____.
    a. Committed
    b. Non Committed
    c. Rolled back earlier
    d. Commit point

20. A row in a table represents_____ among a set of values.
    a. Collection of relationships
    b. Relationship
    c. Unique name
    d. All of the above

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(Descriptive)

Time : 2 hr. 30 mins. Marks : 50

[Answer question no.1 & any four (4) from the rest]

1. How it is possible to create relational schema using ER diagram? Explain all the possible rules for this using the Hostel Management System as a case study. 10

2. a) Take an example, you are going to travel abroad with your family. So, the first thing is to book an airline ticket. Which technique of DBMS is most useful in this situation, justify and explain why? 4+6=10
   b) How serializability is used in DBMS? Explain with proper example.

3. a) Which concept of DBMS is similar to what we see in books? Explain why it is similar. 4+6=10
   b) Consider a situation to search the name of the countries based on the ascending order of their growth of industries based on a survey. Justify which method of searching is most suitable to retrieve the records in the fastest way?

4. a) Why Keys are used in DBMS? 4+6=10
   b) Consider a table of Medicine with its related fields. Now identify the super key, candidate key, alternate key, primary key from the fields & justify with proper reason.

5. a) Consider the following transactions with data items P and Q initialized to zero: 5+5=10

```
T1: read (P) ;
    read (Q) ;
    if P = 0 then Q : = Q + 1 ;
    write (Q) ;
T2: read (Q) ;
    read (P) ;
    if Q = 0 then P : = P + 1 ;
    write (P) ;
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   Any non-serial interleaving of T1 and T2 for concurrent execution leads to what, justify and explain with proper reason.
   b) Consider the following four schedules due to three transactions (indicated by the subscript) using read and write on a data item x, denoted by r(x) and w(x) respectively. Justify & elaborate with proper reason that which one of them is conflict serializable.

(A) $r_1(x)$; $r_2(x)$; $w_1(x)$; $r_3(x)$; $w_2(x)$

(B) $r_2(x)$; $r_1(x)$; $w_2(x)$; $r_3(x)$; $w_1(x)$

(C) $r_3(x)$; $r_2(x)$; $r_1(x)$; $w_2(x)$; $w_1(x)$

(D) $r_2(x)$; $w_2(x)$; $r_3(x)$; $r_1(x)$; $w_1(x)$

6. a) In an inventory management system implemented at a trading corporation, there are several tables designed to hold all the information. Amongst these, the following two tables hold information on which items are supplied by which suppliers, and which warehouse keeps which items along with the stock-level of these items. Supply = (supplierid, itemcode) and Inventory = (itemcode, warehouse, stocklevel). For a specific information required by the management, write the SQL query for the warehouse at Nagpur that will find all suppliers who supply two or more items. 5+5=10

   b) Write a query in SQL to display the supplierid, itemcode, warehouse, stocklevel whose stocklevel is more than the minimum stocklevel.

7. a) Explain how Functional Dependency is also used in Multi valued dependency in an extended way. 4+6=10

   b) Consider an example of a table Product to explain all types of normal forms.

8. a) What is the significance of using an ER Diagram in a database? Write down the symbols used in ER Diagram. 6+4=10

   b) Draw an ER Diagram for Online Examination Management System.

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