BRAINWARE UNIVERSITY

Term End Examination 2023

Programme – B.Tech.(CSE)-2017/B.Tech.(CSE)-2018/B.Tech.(CSE)-2019/B.Tech.(CSE)-2020

Course Name – Database Management System/Database Management Systems

Course Code - BCSE501/PCC-CS501

(Semester V)

Full Marks : 60   **Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question)   1 x 15=15

1. *Choose the correct alternative from the following :*

(i) A transaction completes its execution is said to be

   a) Queried   b) Aborted
   c) Committed   d) Failed

(ii) Consider the following two commands for a TRANSACTION: Commit; ROLLBACK; Choose what does Rollback do?

   a) Undoes the transactions before commit   b) Clears all transactions
   c) Redoes the transactions before commit   d) No action

(iii) The transaction can no longer continue with its normal execution because of some internal condition, such as bad input, data not found, overflow, or resource limit exceeded. The error is measured as

   a) Read error   b) Boot error
   c) Logical error   d) System error

(iv) Write the SQL for Object Query Language.

   a) Similar to SQL and uses a select-from-   b) Similar to SQL and uses a select-where
      where structure   structure
   c) Similar to SQL and uses a from-where   d) Not similar to SQL
      structure

(v) Choose in which database, data is organized in the form of trees with nodes.

   a) Hierarchical   b) Relational
   c) Network   d) Object oriented

(vi) Ensuring isolation property is the responsibility of the (validate)

   a) Recovery-management component of the   b) Concurrency-control component of the
      DBMS   DBMS
   c) Transaction-management component of   d) Buffer management component in DBMS
      the DBMS

(vii) Rows of a relation are established as_____

a) entity | b) degree
c) tuples | d) attricute

(viii) In SQL,determine from the following which is a Data Manipulation Language(DML) command?

a) create | b) alter
c) merge | d) drop

(ix) Indicate the subset of a super key is a candidate key under what condition?

a) No proper subset is a super key | b) All subsets are super keys
c) Subset is a super key | d) Each subset is a super key

(x) Select a table represents a relationship among a set of values

a) Column | b) Key
c) Row | d) Entry

(xi) Identify an attribute in a relation is a foreign key if the _____ key from one relation is used as an attribute in that relation

a) Candidate | b) Primary
c) Super | d) Sub

(xii) The attribute AGE is calculated from DATE_OF_BIRTH. Observe the attribute AGE is

a) Single valued | b) Multi valued
c) Composite | d) Derived

(xiii) Identify the following gives a logical structure of the database graphically?

a) Entity-relationship diagram | b) Entity diagram
c) Database diagram | d) Architectural representation

(xiv) For a weak entity set to be meaningful, it must be associated with another entity set, describe the

a) Identifying set | b) Owner set
c) Neighbour set | d) Strong entity set

(xv) The Oracle RDBMS uses the _____ statement to declare a new transaction start and its properties.

a) BEGIN | b) SET TRANSACTION
c) BEGIN TRANSACTION | d) COMMIT

Group-B
(Short Answer Type Questions)

3 x 5=15

2. Ask the Relational Algebra statements on the following tables: (3)

SALESPEOPLE (snum, sname, city, commission)

CUSTOMERS (cnum, cname, city, rating, snum)

ORDERS (onum, amt, odate, cnum, snum)

Identify all customers located in cities where salesperson 'Amit' has customers.

3. For a given Relation $R = \{A, B, C, D, E, F\}$ and set of functional dependencies $F = \{AB \rightarrow C, C \rightarrow A, BC \rightarrow D, ACD \rightarrow B, BE \rightarrow C, CE \rightarrow FA, CF \rightarrow BD, D \rightarrow EF\}$, Calculate the candidate keys. (3)

4. Analyze Concurrency Control Protocol and deduce the problems of concurrency. (3)

OR

Analyze the concept of cascading rollback with proper examples. (3)

5. Report Multi valued Dependency with a suitable example. (3)

OR

Express the concept of indexing and identify the different types of indexing. (3)

6. Discover the closure of attribute set (AG) i.e. $(AG)^+$ in the relational schema R and (3) set of functional dependencies F as given below: $R = (A, B, C, G, H, I)$; $F = \{A \rightarrow B, A \rightarrow C, CG \rightarrow H, CG \rightarrow I, B \rightarrow H\}$

OR

Recall the definition of functional dependency to determine that each of Armstrong's (3) axioms (reflexivity, augmentation, pseudo-transitivity, union & decomposition) are sound.

Group-C
(Long Answer Type Questions)   5 x 6=30

7. Design a generalization - Specialization hierarchy for a motor-vehicle sales company. The (5) company sells motorcycles, passenger cars, vans, and buses. Justify your placement of attributes at each level of the hierarchy. Explain why they should not be placed at a higher or lower level.

8. Distinguish between locking and timestamp protocols for concurrency controls. (5)

9. State Relational Algebra statements on the following tables: (5)

SALESPEOPLE (snum, sname, city, commission)

CUSTOMERS (cnum, cname, city, rating, snum)

ORDERS (onum, amt, odate, cnum, snum)

Show the commissions of all the salespersons who receive at least one order of amount greater than Rs. 5,000.

Find all customers located in cities where salesperson 'Amit' has customers.

10. Consider the following relation REFRIG (Model, Year, Price, Manuf_plant, Color) (5) and with the following dependencies:

F = {M→MP, {M, Y} → P, MP→C}

Identify each of the following as a candidate key for REFRIG, giving reasons why it can or cannot be a key: { M }, {M, Y }, { M, C }

11. Consider the file with r = 30000 records (fixed-length) of size R = 100 bytes stored on a (5) disk with block size, B= 1024 bytes. Suppose each index entry in the index file takes 15 (9 bytes for index value, 5 bytes for pointer) bytes. Estimate the number of accessing blocks for the clustering index.

OR

Consider each order has unique order_id for each order, following information are (5) stored:

Order (order_id, order_dt, customer_name, customer_address, salesman_name, salesman_address) and for each requested item store

Store (itemcode, itename, quantity and rate).

Further assume, following functional dependencies:

Salesman_name → salesman_address

Customer_name → customer_address

order_id → order_dt, salesman_name, customer_name.

order_id, icode → quantity

icode → iname, rate

Prepare the data structure up to 3rd Normal Form, showing the steps. Indicate Primary Key & Foreign Key also.

12. Analysis the schedule whether it is conflict or serial schedule. If conflict then write (5) down the equivalent serial schedule:

T_1	T_2	T_3
		$R(y)$
		$R(z)$
$R(x)$		
$W(x)$		
		$W(y)$
	$R(z)$	$W(y)$
$R(y)$		
$W(y)$		
	$R(y)$	
	$W(y)$	
	$R(x)$	
	$W(x)$	

OR

Consider the following proposed rule for functional dependencies: (5)
If $A \rightarrow B$ and $C \rightarrow B$, then $A \rightarrow C$. Criticize that this rule is not sound by showing a relation r that satisfies $A \rightarrow B$ and $C \rightarrow B$, but does not satisfy $A \rightarrow C$.

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