BRAINWARE UNIVERSITY

Term End Examination 2024-2025
Programme – B.Tech.(CSE)-DS-2021/B.Tech.(CSE)-DS-2022
Course Name – Database Management Systems
Course Code - PCC-CSD501
(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) Identify that a relational database consist of a collection of
   a) Tables b) Fields
   c) Records d) Keys

(ii) Identify the term that is used to refer a row in relational database.
   a) Attribute b) Tuple
   c) Field d) Instance

(iii) Identify ER
   a) Entity Row b) Entity Relationship
   c) Entity Rename d) Entity Relation

(iv) Indicate the one from the following that creates a virtual relation for storing the query
   a) Function b) View
   c) Procedure d) None of these

(v) Choose the option that hashing is related to
   a) Sort data b) Retrieve data quickly
   c) Create a backup of data d) Encrypt data

(vi) component of a DBMS is responsible for translating high-level SQL queries into low-level instructions for query execution
   a) Query Optimizer b) Query Parser
   c) Query Executor d) Query Planner

(vii) Select the purpose of a concurrency control policy in a database system
   a) To enforce serial execution of transactions b) To allow maximum concurrency while ensuring data consistency

c) To minimize encryption overhead
d) To prevent transactions from executing concurrently

(viii) _____properties ensures that a schedule is serializable
a) Recoverability
b) Consistency
c) Atomicity
d) Conflict Serializability

(ix) Choose the benefit of ensuring serializability in transaction processing
a) Reduced encryption overhead
b) Increased throughput
c) Lower latency
d) Enhanced security

(x) State if the state of the database no longer reflects a real state of the world that the database is supposed to capture, then such a state is called
a) Consistent state
b) Parallel state
c) Durable state
d) Inconsistent state

(xi) Choose the critical element of a database security policy
a) Data storage capacity
b) Data encryption
c) Data redundancy
d) Data indexing

(xii) _____data encryption in a database security policy help achieve
a) Improved performance
b) Data integrity
c) Data confidentiality
d) Data availability

(xiii) Identify the component of a database security policy helps protect data from unauthorized access during transmission
a) Firewalls
b) Indexes
c) Triggers
d) Hash functions

(xiv) Select the best storage strategy to improve data retrieval performance in large databases.
a) Indexing
b) Clustering
c) Partitioning
d) Sharding

(xv) Identify the key advantage of B-trees over binary search trees in database indexing.
a) Balanced height
b) Balanced nodes
c) Binary search
d) Self-balancing

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Explain the difference between 3NF and BCNF in database normalization. (3)
3. State Armstrong's Axioms (3)
4. Explain the purpose of a security policy in database design? (3)
5. Explain the concept of aggregation with the help of a diagram (3)
6. Explain relational algebra and relational calculus. (3)

OR

Explain different key components of query optimization in brief. (3)

Group-C

(Long Answer Type Questions) 5 x 6=30

7. Analyze the technique that are used for optimizing the query execution plan (5)
8. Explain the phenomenon of a cascading rollback in concurrency control and illustrate how does a cascading rollback occur? (5)
9. Explain the basic operations of Relational Algebra. Give examples to illustrate each operation. (5)

10. Explain the concept of clustering in B-Tree and its implications on storage and retrieval. Illustrate how does clustering enhance storage efficiency? (5)
11. Describe the importance of each aspect in ensuring data integrity and effective database design. (5)
12. (5)

Ename	DependentName	DependentRelation	PositionDate	PositionTitle	City	Phone
x	surpankha	Wife	1 June 2020	Salesman	lanka	123
x	katrina	Daughter	1 June 2020	Salesman	lanka	123
x	surpanakha	Wife	10 sep 2022	manager	lanka	123
x	katrina	Daughter	10 sep 2022	manager	lanka	123

Table: Emp_Dependent

Find out the maltivalued dependency (MVD) in the existing table in step by step manner and decompose the table Emp_dependent table into 4NF.

OR

Consider the following schedule: (5)

T1	T2	T3
R(X)		
		R(Y)
		R(X)
	R(Y)	
	R(Z)	
		W(Y)
	W(Z)	
R(Z)		
W(X)		
W(Z)		

Idenitfy the conflicting operations, draw the corresponding precedence graph, and idenitfy that the schedule is conflict serializable or not

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