



BRAINWARE UNIVERSITY

Term End Examination 2022

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) Consider the following two commands for a TRANSACTION: Commit; ROLLBACK; What does Rollback do?
 - a) Undoes the transactions before commit
 - b) Clears all transactions
 - c) Redoes the transactions before commit
 - d) No action
- (ii) In order to maintain the consistency during transactions, database provides
 - a) Redo
 - b) Atomic
 - c) Flashback
 - d) Retain
- (iii) Predict the processes of selecting the data storage and data access characteristics of the database?
 - a) Logical database design
 - b) Physical database design
 - c) Testing and performance tuning
 - d) Evaluation and selecting
- (iv) Select which of the following is a procedure for acquiring the necessary locks for a transaction where all necessary locks are acquired before any are released?
 - a) Record controller
 - b) Exclusive lock
 - c) Authorization rule
 - d) Two phase lock
- (v) Recognize the logical design of the database, and the database _____ which is a snapshot of the data in the database at a given instant in time
 - a) Instance, Schema
 - b) Relation, Schema
 - c) Relation, Domain
 - d) Schema, Instance
- (vi) Select an integrity constraint requires that the values appearing in specified attributes of any tuple in the referencing relation also appear in specified attributes of at least one tuple in the referenced relation
 - a) Referential
 - b) Referencing
 - c) Specific
 - d) Primary
- (vii) Determine a top-down approach in which one higher level entity can be divided into two lower level entities.
 - a) Aggregation
 - b) Specialization

- c) Generalization
 (viii) Consider the employee work-team example, and assume that certain employees participate in more than one work team. Observe a given employee may therefore appear in more than one of the team entity sets that are lower level entity sets of employee. Thus, the generalization is _____
- a) Overlapping
 b) Disjointness
 c) Uniqueness
 d) Relational
- (ix) Determine in a relational database, each tuple is divided into fields called _____
- a) Relations
 b) Domains
 c) Queries
 d) Functions
- (x) Weak entity set is identified by
- a) Underline
 b) Double line
 c) Double diamond
 d) Double rectangle
- (xi) Observe similarities between the instructor entity set and the secretary entity set in the sense that they have several attributes that are conceptually the same across the two entity sets: namely, the identifier, name, and salary attributes. This process is called
- a) Commonality
 b) Specialization
 c) Generalization
 d) Similarity
- (xii) Select the following is an attribute that can uniquely identify a row in a table?
- a) Secondary key
 b) Candidate key
 c) Alternate key
 d) Foreign key
- (xiii) 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 (write)
- a) Consistent state
 b) Inconsistent state
 c) Parallel state
 d) Durable state
- (xiv) Infer technology in order to maintain transactional integrity and database consistency?
- a) Triggers
 b) Locks
 c) Both trigger and lock
 d) None of these
- (xv) Determine in SQL, TCL stands for _____
- a) Transmission Control Language
 b) Transaction Central Language
 c) Ternary Control Language
 d) Transaction Control Language

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

3. Explain the concept of aggregation with a suitable example. (3)
4. Develop an ER diagram for a travel agency consisting of the following: Customers, buses, drivers, conductors, guides, tickets, booking, agents, reservations, conducted tours, and hotels. (3)
5. Estimate the multi-version two-phase locking with the lock conversion technique. (3)

OR

- Differentiate the wait-die and wound-wait protocols for deadlock prevention. (3)
6. Compose the benefit of strict two-phase locking provided. (3)

OR

Express the concept of Primary Indexing with a suitable example. (3)

Group-C

(Long Answer Type Questions)

5 x 6=30

7. Construct an E-R diagram for the following problem: A store has different counters managed by different employees. A counter has different items, but no two counters have common items. Customers buy from different counters but bills are prepared at the bill counters only. Once a month performance of persons managing counters is evaluated in terms of sales. Items are also reviewed and slow-moving items are identified. (5)
8. Consider the following two transactions: (5)

T_1 : read (A);

read (B);

if A = 0, then B: = B + 1;

write (B)

T_2 : read (B);

read (A);

if B = 0, then A: = A + 1;

write (A)

Add lock and unlock instructions to transactions T_1 and T_2 , so that they observe the two-phase locking protocol. Compute the execution of these transactions result in a deadlock or not.

9. Define Three-Schema Architecture of Database Management System. (5)

OR

Identify the difference between Single-valued vs Multi-valued and Stored vs Derived attributes. (5)

10. The IT Training Group (Kolkata) has contacted you to create a conceptual model by using the Entity-Relationship data model for a database that will meet the information needs for its training program. The Company Director has provided the following description of the training group's operating environment. The Company has twelve instructors and can handle up to one hundred trainees per training session. The Company offers five advanced technology courses, each of which is taught by a teaching team of two or more instructors. Each instructor is assigned to a maximum of two teaching teams or may be assigned to do research. Each trainee undertakes one advanced technology course per training session. Identify an ER diagram for IT Training Group (Kolkata) based on the preceding information. (5)

OR

Identify the ER diagram to capture the requirements stated below: A company has several business units. Each business unit has multiple projects. Employees must be assigned to one business unit. One or more employees are assigned to a project, but an employee may be on vacation and not assigned to any project. One of the assigned employees will be the project manager for the project. (5)

11. Explain the two-phase locking protocol with a proper example. (5)

OR

Deadlock cannot occur in time stamp-based protocol. Criticize it. (5)

12. Consider the file with $r = 30000$ records (fixed-length) of size $R = 100$ bytes stored on a disk with block size, $B = 1024$ bytes. Suppose each index entry in the index file takes 15 (9 bytes) (5)

for index value, 5 bytes for pointer) bytes. Estimate the number of accessing blocks for the clustering index.

OR

Consider insertion sequence: 8, 5, 1, 7, 3, 12, 9, 6, 20, 13. Construct B Tree with order 3. (5)
