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BRAINWARE UNIVERSITY

Term End Examination 2025-2026

Programme – B.Tech.(CSE)-AIML-2021/B.Tech.(CSE)-AIML-2022/B.Tech.(CSE)-DS-2022/B.Tech.(CSE)-AIML-2023/B.Tech.(CSE)-DS-2023/B.Tech.(CSE)-2023

Course Name – Database Management Systems

Course Code - PCC-CSM501/PCC-CSD501/PCC-CSG501

(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) Select from a table identifies of a relationship among a set of values.

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

(ii) Select from the following is the set of permitted values for each attribute of a relation.

a) Domain b) Relation
c) Set d) Schema

(iii) Select a multivalued attribute from the following

a) Phone_number b) Name
c) Date_of_birth d) All of these

(iv) Identify the primary goal of Dependency Preservation in database design:

a) To ensure that all functional dependencies are preserved during normalization b) To optimize query performance
c) To minimize redundancy in data storage d) To manage database access permissions

(v) Identify the primary goal of achieving Second Normal Form (2NF) in database normalization:

a) To eliminate duplicate columns b) To remove partial dependencies of non-key attributes on a candidate key
c) To ensure that all attributes are atomic d) To separate data into different tables

(vi) Identify the normal form that is concerned with ensuring a relation is free from anomalies due to the existence of non-trivial functional dependencies between superkeys and attributes:

a) 1NF b) 2NF
c) BCNF d) None of these

(vii) Choose the cheapest memory device in terms of costs/ bit

a) Semiconductor memory b) Magnetic disks

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c) Compact disks d) Magnetic tapes

(viii) __________ is increasingly being used in server systems to develop performance by caching frequently used data, since it provides faster access than disk, with larger storage capacity than main memory. Choose the correct option.

a) Flash memory b) Disk
c) Main memory d) Secondary memory

(ix) Choose that If a piece of data is stored in two places in the database, then

a) Storage space is wasted
b) Changing the data in one spot will cause data inconsistency
c) It can be more easily accessed
d) Storage space is wasted & changing the data in one spot will cause data inconsistency

(x) Choose the correct one: An audit trail _____

a) Is used to make backup copies
b) Is the recorded history of operations performed on a file
c) Can be used to restore lost information
d) None of these

(xi) Choose from the following: A data dictionary is a special file that apply the composition of

a) The names of all fields in all files
b) The data types of all fields in all files
c) The widths of all fields in all files
d) All of these

(xii) Choose the characteristics of transactions

a) Atomicity b) Durability
c) Isolation d) All of these

(xiii) In order to maintain transactional integrity and database consistency, apply the technology a DBMS deploy

a) Triggers b) Pointers
c) Locks d) Cursors

(xiv) If a transaction does not modify the database until it has committed, it is said to choose the __________ technique.

a) Deferred-modification b) Late-modification
c) Immediate- modification d) Undo

(xv) Identify the __________ phase, the system replays updates of all transactions by measuring the log forward from the last checkpoint.

a) Repeating b) Redo
c) Replay d) Undo

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Choose between a locking-based concurrency control mechanism and a timestamp-based concurrency control mechanism for a database system. (3)
3. Explain Transaction in the context of a database management system. (3)
4. Describe the key requirement for a table to be in Third Normal Form (3NF). (3)
5. 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)
6. Explain a serial schedule and evaluate how does it relate to transaction processing? (3)

OR

Explain a serializable schedule and conclude why is it important for database systems? (3)

Group-C

(Long Answer Type Questions) 5 x 6=30

7. Explain the ACID properties in the context of database transactions. (5)
8. Define super key,candidate key, primary key, alternate key and composite key with suitable examples. (5)
9. Discuss Relational Algebra in Database Management System. (5)
10. Illustrate whether B+ tree follows a multi level indexing? How does it differ from B-tree? (5)
11. Summarize deadlock and Explain deadlock prevention, deadlock detection. (5)
12. Evaluate the significance of integrity constraints in a relational database. (5)

OR

Analyze the key characteristics of the Entity-Relationship model and the Relational data model. (5)

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