

Seat No:

Enrollment No:

PARUL UNIVERSITY
FACULTY OF IT & COMPUTER SCIENCE
MCA(A.Y.-II) / M.Sc.IT Winter 2024-25 Examination

Semester: I

Subject Code: 05201107 / 05202109

Subject Name: Advanced Database Management Systems / Advanced Database Management Systems with NoSQL

Date: 20-12-2024

Time: 02:00 PM TO 4:30 PM

Total Marks: 60

Instructions:

1. All questions are compulsory.
2. Make suitable assumptions whenever necessary.
3. Write the answers for both sections on separate answer sheets.

SECTION - A [30 Marks]				
Q1	Answer the following questions:	[20]	CO	BT
(a)	Answer all questions	(5)		
i.	Which component of a DBMS is responsible for processing user queries? (A) A) Database Engine (B) B) Query Processor (C) C) Data Dictionary (D) D) User Interface	1	CO1	BT1
ii.	What type of relationship exists when one entity is related to multiple entities in another set? (A) A) One-to-One (B) B) One-to-Many (C) C) Many-to-One (D) D) Many-to-Many	1	CO1	BT2
iii.	What is a view in SQL?	1	CO2	BT2
iv.	Define a variable in the context of ADBMS.	1	CO2	BT1
v.	Compare the data retrieval efficiency of RDBMS, OODBMS, and ORDBMS in handling complex queries.	1	CO1	BT2
(b)	Attempt Any Five Questions out of Seven	(15)		
i.	Demonstrate how you can convert a Super Key into a Candidate Key in a relational schema.	3	CO1	BT3
ii.	Write a Relational Algebra expression to find all students who have enrolled in 'Database Systems' but not in 'Computer Networks.'	3	CO2	BT4
iii.	Analyze how the structure of a SQL JOIN query affects query performance.	3	CO2	BT4
iv.	Illustrate with an example how data is stored in an Object-Relational Database.	3	CO1	BT3
v.	Analyze the impact of functional dependency violations on database consistency.	3	CO1	BT4
vi.	Explain how to handle errors when using a cursor in a SQL transaction.	3	CO2	BT3
vii.	Write an SQL query using a CASE statement to categorize employees based on their salaries.	3	CO2	BT3
Q2	Answer/Solve following in detail (Attempt any 2 out of 3)	[10]		
(a)	Identify and analyze the various components of a DBMS. How does each component interact to ensure efficient data management?	5	CO1	BT4
(b)	Examine how one-to-many relationships are represented in a relational database and provide a scenario where this type of relationship is most effective.	5	CO1	BT4
(c)	Compare how aggregate functions (like SUM, COUNT, AVG) can be used with and without the GROUP BY clause in SQL. Provide an example of each case.	5	CO2	BT4
SECTION - B [30 Marks]				

Q1	Answer the following questions:	[20]	CO	BT
(a)	Answer all questions	(5)		
i.	How can stored procedures enhance security in a DBMS? (A) A) By hiding the database schema from users (B) B) By allowing direct access to the database (C) C) By automatically encrypting all data (D) D) By requiring users to write complex queries	1	CO3	BT2
ii.	Which of the following best describes the principle of least privilege in RBAC? (A) A) Users can access all data. (B) B) Users can only access the data necessary for their roles. (C) C) All users have the same access level. (D) D) Users have access to data based on seniority.	1	CO4	BT2
iii.	What is the difference between a differential backup and an incremental backup?	1	CO4	BT1
iv.	What is the basic architecture of a stored procedure?	1	CO3	BT2
v.	What does it mean to grant privileges in a database?	1	CO4	BT1
(b)	Attempt Any Five Questions out of Seven	(15)		
i.	Evaluate the potential drawbacks of using stored procedures in a DBMS.	3	CO3	BT4
ii.	Illustrate how you would use a package to group related stored procedures and functions.	3	CO3	BT3
iii.	Apply the concept of isolation to a scenario where two users are attempting to update the same record simultaneously. What issues might arise?	3	CO4	BT3
iv.	Discuss the potential risks associated with relying solely on PKI for database security. What additional measures should be implemented?	3	CO4	BT4
v.	How would you invoke a stored procedure from an application using SQL?	3	CO3	BT3
vi.	Assume a database system has a predefined role for a data analyst. What specific access permissions would you assign to this role? Justify your choices.	3	CO4	BT3
vii.	Analyze the impact of not having a backup strategy on an organization's data integrity and availability.	3	CO4	BT3
Q2	Answer/Solve following in detail (Attempt any 2 out of 3)	[10]		
(a)	Create a stored procedure that implements recursive logic to navigate hierarchical data structures (e.g., an organizational chart). Discuss the considerations you took into account for performance and efficiency.	5	CO3	BT6
(b)	Critique the trade-offs between user convenience and database security when managing access controls. How can a balance be achieved?	5	CO4	BT5
(c)	Evaluate the role of NoSQL databases in modern data management. How do they address challenges faced by traditional relational databases, particularly in terms of scalability and flexibility?	5	CO4	BT5