JHARKHAND Rai University
RANCHI

End Semester/Reappear (Semester V) Examination December, 2024

Programme: B. Tech CSE

Course: Database Management Systems **Full Marks: 70**

Course Code: 3PCCCS301 **Time: 3 Hrs.**

Enrolment no. _____

Q. No.	Questions	CO	Bloom Taxonomy Category	Marks
	Section I			
1	**Short Answer type questions**			**4 x 5 = 20**
a	Differentiate between physical data independence and logical data independence.	CO1	Understand	
	or			
	Define data abstraction in the context of a database management system (DBMS). Why is it important?	CO1	Remember	
b	Explain the concept of a lossless join in relational database design with an example.	CO2	Understand	
	or			
	Differentiate between DDL (Data Definition Language) and DML (Data Manipulation Language) constructs in SQL. Give two examples of each.	CO2	Understand	
c	Explain the primary difference between hashing and B-trees as storage strategies in indexing.	CO3	Understand	
	or			
	Briefly describe how collision handling works in hashing. Mention one common collision resolution technique.	CO3	Understand	
d	Define the ACID properties in the context of database transactions and explain why they are essential for transaction management.	CO4	Remember	
	or			
	What is timestamp-based concurrency control and how does it ensure serializability?	CO4	Understand	
	Section II			
Long Answer type questions				**3 x 10 = 30**
2	Discuss the main features of the network data model. How does it differ from the hierarchical and relational data models?	CO1	Understand	
	or			
	Explain the purpose and types of integrity constraints, such as primary keys, foreign keys, and unique constraints. How do they ensure data consistency?	CO1	Evaluate	
3	Explain the different types of join strategies in query processing. Which strategy is most efficient for large datasets?	CO2	Evaluate	
	or			
	Discuss the advantages and disadvantages of using MySQL, Oracle, and SQL Server. In what situations would you recommend each one?	CO2	Understand	
4	Discuss the principles of Multi-Factor Authentication (MFA). How does it enhance security and what are some of the common methods used in MFA?	CO5	Understand	
	or			
	Compare and contrast Discretionary Access Control (DAC), Mandatory Access Control (MAC), and Role-Based Access Control (RBAC).	CO5	Evaluate	
	Section III			
	Application based questions			**1 x 20 = 20**
5	In a B-tree of order 5, illustrate the deletion process by removing keys 50, 70, and 80 from an initial B-tree containing the keys [10, 20, 30, 40, 50, 60, 70, 80, 90]. Use diagrams to show the structure of the tree after each deletion and explain how each removal maintains the properties of the B-tree.	CO3	Create	

or			
Explain how hash-based indexing and B-tree indexing strategies handle storage and retrieval differently. Discuss the trade-offs between speed, memory usage and suitability for various data types in each strategy.	CO2	Analyze	

COURSE OUTCOME

At the end the course the candidate will able to

CO1: For a given query write relational algebra expressions for that query and optimize the developed expressions

CO2: For a given specification of the requirement design the databases using E-R method and normalization

CO3: For a given specification construct the SQL queries for Open source and Commercial DBMS - MYSQL, ORACLE, and DB2

CO4: For a given query optimize its execution using Query optimization algorithms for a given transaction- processing system, determine the transaction atomicity, consistency, isolation and durability

CO5: Implement the isolation property, including locking, time stamping based on concurrency control and Serializability of scheduling