BACHELOR OF TECHNOLOGY (CBCS - 2023)
B. Tech. Sem-IV Information Technology : WINTER: 2025
SUBJECT: ADVANCED DATABASE SYSTEMS

Day : Monday
Date : 01/12/2025

W-29316-2025

Time : 10:00 AM-01:00 PM
Max. Marks : 60

NB :
1. All questions are COMPULSORY.
2. Figures to the right indicate FULL marks for the question.
3. Draw neat labelled diagrams WHEREVER necessary.
4. Assume suitable data, if necessary.

Q. 1	Analyze how location, replication, fragmentation types of transparency impact the usability and maintenance of a distributed DBMS.	(10)
	OR	
Q. 1	Evaluate the implications of global directory management in a distributed DBMS and recommend an approach for a multinational company.	(10)
Q. 2	State the objectives of query optimization. Justify the use of cost-based optimization in a distributed setting.	(10)
	OR	
Q. 2	Infer the role of load balancing in distributed query optimization and how it influences overall system performance.	(10)
Q. 3	Analyze the relationship between query granularity and the performance of parallel query execution. How does granularity influence resource allocation?	(10)
	OR	
Q. 3	Assess how the choice of multiprocessor architecture (shared-nothing, shared-memory, shared-disk) affects the scalability and fault tolerance of a parallel database system.	(10)
Q. 4	Defend the use of the Three-Phase Commit protocol over Two-Phase Commit in high-risk failure environments.	(10)
	OR	
Q. 4	Investigate different failure types in distributed systems and recommend relevant reliability strategies for each.	(10)
Q. 5	Appraise the effectiveness of performance tuning techniques like indexing, query rewriting, and caching for optimizing read-heavy workloads.	(10)
	OR	
Q. 5	Dissect the ETL (Extract, Transform, Load) process and explain its importance in building a reliable data warehouse.	(10)
Q. 6	Assess the benefits and trade-offs of using NoSQL databases in large-scale real-time systems like social media platforms.	(10)
	OR	
Q. 6	Compare the different types of NoSQL databases and classify suitable use cases for each.	(10)

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