23DAU419N

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2025
(Fourth Semester)

Branch - **COMPUTER SCIENCE WITH DATA ANALYTICS**

MODERN DATABASE SYSTEMS

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks

(10 × 1 = 10)

Question No.	Question	K Level	CO
1	What is the main goal of fragmentation in a distributed DBMS? a) To distribute the entire database across multiple sites b) To divide relations into smaller fragments to improve performance c) To allocate all data to a single site d) To replicate data across all sites	K1	CO1
2	Identify which of the following is typically NOT part of the DBMS-related functionality running on both the client and the server. a) Query processing b) Operating system software c) Communication software d) Transaction management	K2	CO2
3	State the main advantage of parallel database systems. a) Lower storage costs b) High-performance, high-availability, and extensibility c) Reduced system complexity d) Increased database replication	K1	CO3
4	Identify the term sometimes used interchangeably with "partitioning" in parallel databases. a) Clustering b) Declustering c) Indexing d) Fragmentation	K2	CO2
5	Which of the following is NOT a common characteristic of NoSQL databases? a) Using the relational model b) Running well on clusters c) Being open-source d) Being schemaless	K1	CO1
6	Select the common feature shared by all aggregate-oriented data models. a) They use a relational schema for data storage b) They rely on indexing for fast lookup c) They store aggregates indexed by a key for lookup d) They do not support transactions	K2	CO2
7	Tell the Common cohorts included in Hadoop _____ a) MapReduce, Hive and HBase b) MapReduce, MySQL and Google Apps c) MapReduce, Hummer and Iguana d) MapReduce, Heron and Trumpet	K1	CO2
8	Show the language in which Hadoop is written. a) C++ b) java c) Python d) Rust	K2	CO3
9	Recall that HBase is a distributed _____ database built on top of the Hadoop file system. a) Column-oriented b) Row-oriented c) Tuple-oriented d) None of the mentione	K1	CO3
10	Review which of the following is a characteristic of a NoSQL database. a) Uses tables for storage b) Needs a schema c) Requires JOINs d) Uses JSON	K2	CO2

Cont...

SECTION - B (35 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 × 7 = 35)

Question No.	Question	K Level	CO
11.a.	Infer the Promises of DDBS.	K4	CO5
	(OR)		
11.b.	Explain Generic Centralized DBMS Architecture.		
12.a.	Survey on Parallel Query Optimization.	K4	CO5
	(OR)		
12.b.	Evaluate Replication in Database Cluster Architecture.		
13.a.	Summarize the Benefits of Relational Databases.	K5	CO4
	(OR)		
13.b.	Assess the need of Graph Databases.		
14.a.	Summarize the characteristics of Big Data.	K5	CO4
	(OR)		
14.b.	Justify How Hadoop's architecture be optimized to enhance scalability and fault tolerance.		
15.a.	Design a framework to benchmark and compare the performance of different in-memory databases.	K6	CO5
	(OR)		
15.b.	Develop a structured model to illustrate the relationships and functional distinctions between a node, a cluster, and a data center in Cassandra.		

SECTION -C (30 Marks)

Answer **ANY THREE** questions

ALL questions carry **EQUAL** Marks (3 × 10 = 30)

Question No.	Question	K Level	CO
16	Analyze the key challenges in distribution design and their impact on database performance.	K4	CO5
17	Compare and contrast parallel DBMS architectures based on their efficiency with traditional architecture.	K4	CO5
18	Summarize on how can NoSQL databases be designed to address modern data management challenges effectively.	K5	CO4
19	Evaluate the impact of database revolutions on the evolution of data storage and retrieval systems.	K5	CO4
20	Explain briefly the mechanisms used to perform insertion, modification and retrieval of data in MongoDB.	K6	CO5

Z-Z-Z END