SRM VALLIAMMAI ENGINEERING COLLEGE

(An Autonomous Institution)

SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OF INFORMATION TECHNOLOGY

QUESTION BANK

VIII SEMESTER

1908802 ADVANCED DATABASE TECHNOLOGY

Regulation – 2019

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Prepared by

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DEPARTMENT OF INFORMATION TECHNOLOGY

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SUBJECT: Professional Elective IV-Advanced Database Technology

SEM / YEAR: VIII Sem/IV Year

UNIT – I PARALLEL AND DISTRIBUTED DATABASES			
Database System Architectures: Centralized and Client-Server Architectures – Server System Architectures – Parallel Systems- Distributed Systems – Parallel Databases: I/O Parallelism – Inter and Intra Query Parallelism – Inter and Intra operation Parallelism – Distributed Database Concepts - Distributed Data Storage – Distributed Transactions – Commit Protocols – Concurrency Control – Distributed Query Processing – Three Tier Client Server Architecture- Case Studies.			
PART – A			
Q.No	**Questions**	**BT Level**	**Competence**
1.	Define centralized database architecture.	BTL1	Remembering
2.	Define client-server architecture in database systems.	BTL1	Remembering
3.	List the main components of a client-server architecture.	BTL1	Remembering
4.	Mention two advantages of centralized database systems.	BTL1	Remembering
5.	What are parallel systems in the context of database architecture?	BTL1	Remembering
6.	Distinguish between centralized and client-server architectures.	BTL2	Understanding
7.	Interpret the term “I/O parallelism” in parallel databases.	BTL2	Understanding
8.	Differentiate between inter-query and intra-query parallelism.	BTL2	Understanding
9.	Classify the types of parallelism used in parallel databases.	BTL2	Understanding
10.	How does inter-operation parallelism improve database performance?	BTL1	Remembering
11.	Compare distributed databases and centralized databases in terms of fault tolerance.	BTL2	Understanding
12.	Choose the key advantage of distributed data storage in a distributed database.	BTL2	Understanding

13.	Examine the role of commit protocols in distributed databases.	BTL2	Understanding
14.	Why is concurrency control crucial in distributed databases?	BTL2	Understanding
15.	Explain the concept of distributed transactions in database systems.	BTL2	Understanding
16.	Define distributed query processing in database systems.	BTL1	Remembering
17.	List the challenges in distributed database management.	BTL1	Remembering
18.	Mention the key features of a three-tier client-server architecture.	BTL1	Remembering
19.	What is the importance of commit protocols in distributed databases?	BTL1	Remembering
20.	Distinguish between intra-operation and inter-operation parallelism.	BTL2	Understanding
21.	Interpret the significance of data distribution in parallel databases.	BTL2	Understanding
22.	Explain the concept of parallel databases.	BTL2	Understanding
23.	Compare centralized systems and parallel systems in terms of scalability.	BTL2	Understanding
24.	Choose the most suitable system architecture for large-scale enterprise applications: centralized, client-server, or distributed.	BTL2	Understanding
	PART B		
1.	Apply the concept of I/O parallelism to improve database query performance in a parallel database system.	BTL3	Applying
2.	Choose an appropriate commit protocol for a distributed transaction and justify its suitability in maintaining atomicity and consistency.	BTL3	Applying
3.	Develop a three-tier client-server architecture for a distributed database application and explain the roles of each tier.	BTL3	Applying
4.	Construct a distributed database storage strategy for a global e-commerce application to optimize performance and availability.	BTL3	Applying
5.	Identify the challenges associated with concurrency control in distributed database systems and suggest suitable solutions.	BTL3	Applying
6.	Solve the problem of query optimization in a distributed environment by analyzing different distributed query processing techniques.	BTL3	Applying
7.	Select a suitable server system architecture for a high-volume online transaction processing system and explain your choice.	BTL3	Applying
8.	Analyze the advantages and limitations of parallel databases compared to centralized database systems.	BTL4	Analyzing
9.	Classify the types of parallelism in parallel database systems, providing examples of inter-query and intra-query parallelism.	BTL4	Analyzing
10.	Compare centralized and client-server database architectures, highlighting their strengths and weaknesses in different use cases.	BTL4	Analyzing
11.	Contrast inter-operation parallelism and intra-operation parallelism with appropriate examples from parallel database systems.	BTL4	Analyzing

12.	Distinguish between distributed data storage and distributed query processing in a distributed database system.	BTL4	Analyzing
13.	List the steps involved in implementing a concurrency control protocol in a distributed database system.	BTL4	Analyzing
14.	Examine the role of commit protocols in ensuring transaction reliability in a distributed database system.	BTL4	Analyzing
15.	**(i)** Apply the concepts of parallelism in query execution to improve database performance. Explain with examples of inter and intra-query parallelism. (ii) Analyze the differences between centralized and distributed database systems in terms of data storage, processing, and reliability.	BTL3	Applying
16.	**(i)** Construct a diagram and explain the three-tier client-server architecture for database systems, highlighting the roles of each layer. (ii) Identify the key challenges in maintaining concurrency control in distributed database systems and suggest techniques to address them.	BTL3	Applying
17.	**(i)** Compare and contrast inter-operation and intra-operation parallelism in parallel databases, providing use-case examples for both. (ii) Examine the role of commit protocols in ensuring transaction consistency in distributed database systems and discuss their impact on system performance.	BTL4	Analyzing
	PART – C		
1.	Choose an appropriate database system architecture for a large-scale enterprise application and justify your choice based on the scalability and performance requirements (15)	BTL5	Evaluating
2.	Develop a detailed explanation of parallelism in databases, including I/O parallelism, inter and intra-query parallelism, and their impact on query execution performance. (7)	BTL6	Creating
3.	Design a distributed database system architecture, highlighting the methods for data storage, transaction management, and the challenges associated with concurrency control? (7)	BTL6	Creating
4.	Discuss the differences between centralized, client-server, and distributed database systems, focusing on their strengths and limitations in terms of scalability, fault tolerance, and performance.(15)	BTL6	Creating
5.	Justify the use of commit protocols in distributed transactions, explaining how they ensure data consistency and reliability across multiple nodes in a distributed database system.(15)	BTL5	Evaluating
	UNIT – II OBJECT AND OBJECT RELATIONAL DATABASES		
	Concepts for Object Databases: Object Identity – Object structure – Type Constructors – Encapsulation of Operations – Methods – Persistence – Type and Class Hierarchies – Inheritance – Complex Objects – Object Database Standards, Languages and Design: ODMG Model – ODL – OQL – Object Relational and Extended – Relational Systems : Object Relational features in SQL / Oracle – Case Studies.		

PART – A			
Q.No	**Questions**	**BT Level**	**Competence**
1.	Define object identity in object databases.	BTL1	Remembering
2.	Define object structure in the context of object databases.	BTL1	Remembering
3.	List the main type constructors used in object databases.	BTL1	Remembering
4.	Mention the key principles of encapsulation of operations in object-oriented databases.	BTL1	Remembering
5.	What is the role of methods in object databases?	BTL1	Remembering
6.	Distinguish between methods and operations in object-oriented databases.	BTL2	Understanding
7.	Interpret the concept of persistence in object databases.	BTL2	Understanding
8.	Differentiate between object identity and object structure.	BTL2	Understanding
9.	Classify the different types of inheritance in object-oriented databases.	BTL2	Understanding
10.	How do object hierarchies influence the design of object-oriented databases?	BTL1	Remembering
11.	Compare object-oriented databases with relational databases in terms of inheritance support.	BTL2	Understanding
12.	Choose the correct type of database for handling complex objects.	BTL2	Understanding
13.	Examine the importance of complex objects in object-oriented databases.	BTL2	Understanding
14.	Why is object persistence crucial in object databases?	BTL2	Understanding
15.	Explain the role of the ODMG model in object database systems.	BTL2	Understanding
16.	Explain the syntax of the Object Definition Language (ODL).	BTL1	Remembering
17.	List the features of Object Query Language (OQL).	BTL1	Remembering
18.	Distinguish between object-relational and purely relational database systems.	BTL1	Remembering
19.	Mention a key difference between relational and object-relational databases.	BTL1	Remembering
20.	Compare the SQL extensions in Oracle for object-relational databases with standard relational SQL.	BTL2	Understanding
21.	Classify the different types of complex objects in object databases.	BTL2	Understanding
22.	How does object identity affect database query performance?	BTL2	Understanding
23.	Examine how inheritance is implemented in object-oriented database systems.	BTL2	Understanding
24.	Why is the ODMG model considered a standard for object databases?	BTL2	Understanding
PART – B			

1.	Apply the concept of object identity to design a database system for a university management system.	BTL3	Applying
2.	Identify the role of type constructors in defining complex data types in object databases.	BTL3	Applying
3.	Develop an object database schema to demonstrate the encapsulation of operations and explain its significance.	BTL3	Applying
4.	Construct an example to illustrate the use of methods in enhancing database functionality.	BTL3	Applying
5.	Classify the different types of persistence mechanisms in object databases and explain their implementation.	BTL4	Analyzing
6.	Analyze the importance of type and class hierarchies in object databases, using an e-commerce example.	BTL4	Analyzing
7.	Contrast inheritance in programming languages with its implementation in object databases.	BTL4	Analyzing
8.	Distinguish between complex objects and simple objects in databases with suitable examples.	BTL4	Analyzing
9.	Compare the ODMG model with relational database models, focusing on their features and applications.	BTL4	Analyzing
10.	Examine the role of ODL in the design of object-oriented databases with an example.	BTL4	Analyzing
11.	Solve a query using OQL to retrieve data from an object-oriented database and explain the process.	BTL3	Applying
12.	Select the object-relational features in SQL/Oracle and demonstrate their use in database design.	BTL3	Applying
13.	List the key advantages of using object-relational systems over traditional relational systems.	BTL3	Applying
14.	Choose a case study of an object-relational database implementation and explain its design and advantages.	BTL3	Applying
15.	(i) Apply the concepts of encapsulation and object identity to design a class structure for a library management system. Highlight the importance of encapsulation in this design. (ii) Choose the appropriate type constructor (e.g., set, list, array) for storing and managing student records in an object database. Justify your choice with examples.	BTL3	Applying
16.	(i) Develop a schema using ODL (Object Definition Language) for a university database that includes entities like Students, Courses, and Professors. Explain the relationships between the entities. (ii) Analyze the role of object identity and persistence in object databases. Discuss their importance with real-world examples.	BTL4	Analyzing
17.	(i) Classify the different inheritance types supported in object-oriented databases. Explain with examples how inheritance	BTL4	Analyzing

	simplifies complex objectstructures. (ii) Compare and contrast the Object Query Language (OQL) with SQL. Highlight their similarities and differences using relevant query examples.		
PART C			
1.	Choose the key features of object databases that distinguish them from traditional relational databases and explain their significance in modern database management systems.	BTL5	Evaluating
2.	Develop an example to illustrate object identity and object structure in an object database, and explain how these concepts contribute to data modeling.	BTL6	Creating
3.	Design a sample schema using the ODMG model, showing how object identity, encapsulation, and methods can be implemented to model a real-world system.	BTL6	Creating
4.	Discuss the role of inheritance in object databases and how it facilitates code reuse and the creation of complex object hierarchies.	BTL6	Creating
5.	Justify the advantages and challenges of integrating object-oriented concepts into relational database systems, with a focus on object-relational features in SQL/Oracle	BTL5	Evaluating
UNIT – III INTELLIGENT DATABASES			
Active Databases: Syntax and Semantics (Starburst, Oracle, DB2)- TaxonomyApplications-Design Principles for Active Rules- Temporal Databases: Overview of Temporal Databases- TSQL2- Deductive Databases: Logic of Query Languages – Data log- Recursive Rules-Syntax and Semantics of Data log Languages- Implementation of Rules and Recursion- Recursive Queries in SQL- Spatial Databases- Spatial Data TypesSpatial Relationships- Spatial Data Structures-Spatial Access Methods- Spatial DB Implementation.			
PART – A			
1.	Define an active database.	BTL 1	Remembering
2.	List the key components of Starburst active database.	BTL 1	Remembering
3.	Mention the primary differences between Oracle and DB2 in terms of active databases.	BTL 1	Remembering
4.	What are active rules in a database?	BTL 1	Remembering
5.	Distinguish between temporal databases and traditional databases.	BTL 2	Understanding
6.	Interpret the concept of time in temporal databases.	BTL 2	Understanding
7.	Differentiate between TSQL2 and other SQL variants.	BTL 2	Understanding
8.	Classify the types of temporal data supported in TSQL2.	BTL 2	Understanding
9.	How do deductive databases differ from conventional databases?	BTL 1	Remembering
10.	Compare the syntax of Data log and SQL languages.	BTL 2	Understanding
11.	Choose the best method to implement recursion in Data log queries.	BTL 2	Understanding
12.	Examine the advantages of using recursive queries in SQL.	BTL 2	Understanding
13.	Why is spatial data considered complex in database management systems?	BTL 1	Remembering
14.	Explain the role of spatial access methods in spatial databases.	BTL 2	Understanding
15.	Define spatial data types in the context of spatial databases.	BTL 1	Remembering

16.	List the common spatial relationships used in spatial databases.	BTL 1	Remembering
17.	Mention the primary types of spatial data structures.	BTL 1	Remembering
18.	What is the significance of recursive rules in Data log?	BTL 1	Remembering
19.	Distinguish between recursive queries and regular SQL queries.	BTL 2	Understanding
20.	Interpret the importance of spatial indexing in spatial database implementation.	BTL 2	Understanding
21.	Differentiate between spatial data types and other data types in databases.	BTL 2	Understanding
22.	Classify the different types of spatial queries.	BTL2	Understanding
23.	How does the implementation of spatial databases differ from traditional databases?	BTL 1	Remembering
24.	Compare the performance of spatial DB implementations in Oracle and DB2.	BTL 2	Understanding
	PART B		
1.	Apply the principles of active rules in the design of a database system. How would you ensure efficient execution of these rules?	BTL 3	Applying
2.	Choose the most suitable spatial data structure for a geospatial application and justify your selection based on its performance characteristics.	BTL 3	Applying
3.	Develop a temporal database schema using TSQL2 for managing employee attendance records and illustrate its key features.	BTL 3	Applying
4.	Construct an active database system by integrating triggers and rules for a retail application. Discuss the challenges faced during implementation.	BTL 3	Applying
5.	Identify the differences between temporal databases and traditional relational databases. How do these differences influence database design?	BTL 3	Applying
6.	Solve a recursive query in SQL to find all ancestors of a given employee in a hierarchical organization database.	BTL 3	Applying
7.	Select appropriate spatial access methods for optimizing query performance in a GIS database. Provide a rationale for your choice.	BTL 3	Applying
8.	Analyze the impact of recursive rules on the performance of deductive databases. Provide examples to support your analysis.	BTL 4	Analyzing
9.	Classify different types of spatial relationships used in spatial databases and explain their significance with examples.	BTL 4	Analyzing
10.	Compare the syntax and semantics of Data log languages with SQL. Highlight scenarios where each is more effective.	BTL 4	Analyzing
11.	Contrast the implementation approaches of active databases in Oracle, DB2, and Starburst. Discuss their advantages and limitations.	BTL 4	Analyzing
12.	Distinguish between spatial data types and traditional data types in a database system. Provide use cases for each.	BTL 4	Analyzing

13.	List the key components of spatial database implementation and explain their roles in managing spatial data.	BTL 3	Applying
14.	Examine the logic of query languages used in deductive databases. How does it differ from traditional query languages?	BTL 4	Analyzing
15.	(i) Analyze the key differences between active databases and traditional databases in terms of functionality and use cases. (ii) Identify the design principles that should be followed when implementing active rules in a database system like Oracle or DB2.	BTL 4	Analyzing
16.	(i) Compare and contrast the features of temporal databases and deductive databases, highlighting their unique advantages and applications. (ii) Develop a recursive query in SQL to compute the transitive closure of a relationship table, and explain the underlying logic.	BTL4	Analyzing
17.	(i) Classify the various spatial data structures used in spatial databases and examine their suitability for different spatial access methods. (ii) Construct a TSQL2 query to retrieve historical data from a temporal database and **analyze** its semantic components.	BTL4	Analyzing
	PART C		
1.	Choose the most appropriate active database system (e.g., Starburst, Oracle, DB2) for a real-time financial application, considering their syntax, semantics, and key features. Justify your choice.	BTL5	Evaluating
2.	Develop a comprehensive design for implementing active rules in a database system. Discuss the design principles that ensure efficient rule management and execution in a dynamic environment.	BTL6	Creating
3.	Design a temporal database to manage historical stock market data, incorporating features of TSQL2. Discuss how temporal aspects of the data will be stored and queried.	BTL6	Creating
4.	Discuss the syntax and semantics of recursive queries in SQL. How can recursive rules be used to solve hierarchical problems in databases, and what challenges may arise in their implementation?	BTL6	Creating
5.	Justify the choice of spatial data structures and access methods in a Geographic Information System (GIS) application. Discuss how the chosen structures enhance the performance of spatial queries and data retrieval.	BTL5	Evaluating
	UNIT – IV ADVANCED DATA MODELS		
	Mobile Databases: Location and Handoff Management - Effect of Mobility on Data Management - Location Dependent Data Distribution - Mobile Transaction Models - Concurrency Control - Transaction Commit Protocols- Multimedia Databases- Information Retrieval- Data Warehousing- Data Mining- Text Mining.		
	PART – A		
1.	Define mobile databases and explain their significance in mobile applications.	BTL 1	Remembering
2.	List the factors affecting location and handoff management in mobile databases.	BTL 1	Remembering
3.	Mention the impact of mobility on data management in mobile environments.	BTL 1	Remembering

4.	What are the key characteristics of location-dependent data distribution in mobile databases?	BTL 1	Remembering
5.	Distinguish between static and dynamic location-dependent data distribution.	BTL 2	Understanding
6.	Interpret the concept of mobile transaction models in the context of mobile databases.	BTL 2	Understanding
7.	Differentiate between mobile and traditional transaction models in databases.	BTL 2	Understanding
8.	Classify the types of concurrency control mechanisms used in mobile databases.	BTL 2	Understanding
9.	How does concurrency control ensure data consistency in mobile databases?	BTL 1	Remembering
10.	Compare optimistic and pessimistic concurrency control techniques in mobile databases.	BTL 2	Understanding
11.	Choose the most appropriate transaction commit protocol for mobile environments and justify your choice.	BTL 2	Understanding
12.	Examine the role of transaction commit protocols in mobile databases.	BTL 2	Remembering
13.	Why is concurrency control important in mobile transaction management?	BTL 1	Remembering
14.	Explain the challenges in managing multimedia databases on mobile devices.	BTL2	Understanding
15.	Define multimedia databases and describe their applications in mobile computing.	BTL 1	Remembering
16.	List the types of information retrieval techniques commonly used in mobile databases.	BTL 1	Remembering
17.	What is the difference between traditional data warehousing and data warehousing in mobile environments?	BTL 1	Remembering
18.	Distinguish between data mining and text mining in the context of mobile databases.	BTL 2	Understanding
19.	Interpret the role of data mining in enhancing mobile database performance.	BTL 2	Understanding
20.	Differentiate between structured and unstructured data mining in mobile environments.	BTL 2	Understanding
21.	Classify the different types of data warehousing techniques used in mobile computing.	BTL 2	Understanding
22.	How does data mining support decision-making in mobile databases?	BTL 1	Remembering
23.	Compare text mining and data mining in terms of their techniques and applications in mobile environments.	BTL 2	Understanding
24.	Explain the importance of location-dependent data distribution in optimizing mobile database performance.	BTL 2	Understanding

PART B			
1.	Apply the concepts of location and handoff management to design a mobile database system for seamless connectivity in a high-mobility environment.	BTL 3	Applying
2.	Choose appropriate techniques for managing location-dependent data distribution in a mobile environment and justify your selection.	BTL 3	Applying
3.	Develop a mobile transaction model that ensures data consistency and reliability in a multi-user scenario.	BTL 3	Applying
4.	Construct a concurrency control mechanism suitable for mobile databases with intermittent connectivity.	BTL 3	Applying
5.	Identify the challenges involved in transaction commit protocols in mobile databases and propose potential solutions.	BTL 3	Applying
6.	Solve a practical problem where mobility affects data management, demonstrating how mobile databases can handle such scenarios effectively.	BTL 3	Applying
7.	Select suitable techniques for integrating multimedia databases with mobile data systems and explain their advantages.	BTL 3	Applying
8.	Analyze the effect of data warehousing techniques on mobile databases and propose enhancements for real-time data analytics.	BTL 4	Analyzing
9.	Classify the different types of information retrieval methods used in mobile databases and evaluate their effectiveness.	BTL 4	Analyzing
10.	Compare the role of text mining and data mining in enhancing the functionality of mobile database applications.	BTL 4	Analyzing
11.	Contrast traditional database transaction protocols with those used in mobile environments, highlighting the advantages and limitations of each.	BTL 4	Analyzing
12.	Distinguish between location-independent and location-dependent data distribution models in mobile databases.	BTL 4	Analyzing
13.	List the key features required in a transaction model for mobile databases and describe how they address mobility-specific challenges.	BTL 4	Analyzing
14.	Examine the role of concurrency control in maintaining database integrity in a distributed mobile environment, using real-world examples.	BTL 4	Analyzing
15.	(i) Apply the concept of location-dependent data distribution to design a system for managing data in a mobile environment. Describe its components and working. (ii) Analyze the impact of user mobility on database management, focusing on data consistency and availability. Provide examples to support your analysis.	BTL4	Analyzing
16.	(i) Develop a mobile transaction model that ensures consistency and fault tolerance in a highly dynamic mobile network environment. Outline the key steps and considerations. (ii) Contrast different transaction commit protocols used in mobile	BTL3	Applying

	databases, highlighting their efficiency and limitations in handling mobile scenarios.		
17.	(i) Classify the various types of data mining techniques used in multimedia databases and explain how they aid in effective information retrieval. (ii) Examine the role of concurrency control in mobile databases, and discuss the challenges and solutions in ensuring transaction integrity.	BTL4	Analyzing
	PART C		
1.	Choose the most appropriate mobile database architecture for location-dependent data distribution and explain its effectiveness in managing the dynamic mobility of users.	BTL5	Evaluating
2.	Develop a model for managing mobile transactions in a distributed database environment, addressing concurrency control and transaction commit protocols.	BTL6	Creating
3.	Design a system for multimedia databases that handles large-scale data and integrates efficient information retrieval methods to support mobile environments.	BTL6	Creating
4.	Discuss the impact of mobility on data management in mobile environments, specifically focusing on the challenges in location tracking, handoff management, and ensuring data consistency.	BTL6	Creating
5.	Justify the integration of data mining and text mining techniques in mobile databases to enhance information retrieval and decision-making in real-time mobile applications.	BTL5	Evaluating
	UNIT – V EMERGING TECHNOLOGIES		
	XML Databases: XML-Related Technologies-XML Schema- XML Query LanguagesStoring XML in Databases-XML and SQL- Native XML Databases- Web DatabasesGeographic Information Systems- Biological Data Management- Cloud Based Databases: Data Storage Systems on the Cloud- Cloud Storage Architectures-Cloud Data ModelsQuery Languages- Introduction to Big Data-Storage-Analysis.		
	PART- A		
1.	Define an XML database and explain its primary function.	BTL1	Remembering
2.	List the main XML-related technologies used for data representation and manipulation.	BTL1	Remembering
3.	Mention the key components of an XML Schema.	BTL1	Remembering
4.	What are the advantages of using XML Schema over DTD (Document Type Definition)?	BTL1	Remembering
5.	Distinguish between an XML document and an XML Schema.	BTL 2	Understanding
6.	Interpret the role of XML query languages in querying XML data.	BTL 2	Understanding
7.	Differentiate between XPath and XQuery in XML querying.	BTL2	Understanding
8.	Classify the different types of XML query languages.	BTL2	Understanding
9.	How does XML data differ from relational data in traditional SQL databases?	BTL1	Remembering

10.	Compare XML and SQL in terms of data storage and query mechanisms.	BTL2	Understanding
11.	Choose the correct storage approach for XML data in relational databases.	BTL2	Understanding
12.	Examine the features of native XML databases.	BTL2	Understanding
13.	Why are native XML databases considered more efficient for XML data storage?	BTL1	Remembering
14.	Explain the concept of web databases and their role in web applications.	BTL2	Understanding
15.	Define Geographic Information Systems (GIS) and their application in data management.	BTL1	Remembering
16.	List the main benefits of using Geographic Information Systems (GIS) in data analysis.	BTL1	Remembering
17.	What is the role of XML in biological data management?	BTL1	Remembering
18.	Distinguish between traditional databases and cloud-based databases.	BTL 2	Understanding
19.	Interpret how cloud data models differ from traditional data models.	BTL 2	Understanding
20.	Explain the concept of data storage systems on the cloud.	BTL 2	Understanding
21.	Classify the different cloud storage architectures available.	BTL 2	Understanding
22.	How do query languages operate in cloud-based database systems?	BTL1	Remembering
23.	Compare the storage and analysis of big data on cloud systems versus on-premises systems.	BTL 2	Understanding
24.	Mention the challenges associated with storing and analyzing big data in cloud-based environments.	BTL1	Remembering
	PART B		
1.	Apply your knowledge of XML Schema to design a schema for a bookstore database, including book details, author information, and publisher details.	BTL3	Applying
2.	Choose an XML query language (XQuery or XPath) and explain how it can be used to retrieve specific data from an XML document.	BTL3	Applying
3.	Develop an approach to store and retrieve XML data using a Native XML Database, discussing its advantages over traditional databases.	BTL3	Applying
4.	Construct an XML-based solution for a geographic information system to store and manage geospatial data.	BTL3	Applying
5.	**I**dentify the key differences between XML and SQL databases in terms of their structure, querying capabilities, and use cases.	BTL3	Applying
6.	Solve a biological data management problem using an XML-based database system to store and analyze genetic sequence data.	BTL3	Applying
7.	Select a suitable cloud storage architecture for an e-commerce application and justify your choice.	BTL3	Applying
8.	Analyze the role of query languages in cloud databases, focusing on how they enhance data retrieval and manipulation.	BTL4	Analyzing

9.	Classify different types of cloud storage architectures and explain their respective use cases.	BTL4	Analyzing
10.	Compare the features of Native XML Databases with those of Web Databases in terms of scalability, performance, and integration.	BTL4	Analyzing
11.	Contrast the characteristics of cloud data models with traditional data storage models, highlighting their advantages and limitations.	BTL4	Analyzing
12.	Distinguish between data storage systems on the cloud and on-premise systems, focusing on cost, scalability, and security.	BTL4	Analyzing
13.	List the essential features of Big Data storage and analysis systems, explaining how they differ from traditional database systems.	BTL4	Analyzing
14.	Examine the challenges and benefits of using cloud-based databases for storing and analyzing large-scale geographic data.	BTL4	Analyzing
15.	(i) Apply the concepts of XML Schema to define a schema for a simple bookstore XML document, specifying elements for book title, author, price, and publication year. (ii) Analyze the differences between Native XML Databases and Relational Databases with XML storage. Provide examples to support your explanation.	BTL4	Analyzing
16.	(i) Construct an XML query using XQuery to retrieve all books priced below $20 from an XML database. (ii) Classify the different cloud storage architectures based on their design and functionality. Provide examples of services for each type.	BTL3	Applying
17.	(i) Compare the key features of Geographic Information Systems (GIS) and Biological Data Management systems in terms of their data storage and querying requirements. (ii) Examine the challenges of storing and analyzing Big Data in cloud-based databases. Suggest strategies to overcome these challenges.	BTL4	Analyzing
PART C			
1.	Choose the most suitable XML-related technology for storing and querying large datasets. Discuss the advantages and limitations of your choice in the context of performance and scalability	BTL5	Evaluating
2.	Develop an XML schema for a biological data management system. Explain how the schema ensures data integrity and supports efficient querying for complex biological data structures.	BTL6	Creating
3.	Design a cloud-based database architecture for geographic information systems (GIS). Justify the choices of storage, query languages, and scalability features to meet the demands of spatial data management.	BTL6	Creating
4.	Discuss the integration of XML and SQL in modern databases. How does this hybrid approach enhance data management and querying, particularly in the context of web and cloud-based systems?	BTL6	Creating
5.	Justify the use of native XML databases for managing big data in cloud environments. Consider aspects like data storage, scalability, and	BTL5	Evaluating

	performance when dealing with large, complex datasets in a cloud-based infrastructure.		