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NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA
(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: VI - THEORY EXAMINATION (2025 - 2026)

Subject: Advanced Database Management Systems

Time: 3 Hours

Max. Marks: 100

General Instructions:

IMP: Verify that you have received the question paper with the correct course, code, branch etc.

1. This Question paper comprises of **three Sections -A, B, & C**. It consists of Multiple Choice Questions (MCQ's) & Subjective type questions.

2. Maximum marks for each question are indicated on right -hand side of each question.

3. Illustrate your answers with neat sketches wherever necessary.

4. Assume suitable data if necessary.

5. Preferably, write the answers in sequential order.

6. No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.

SECTION-A

20

1. Attempt all parts:-

- (1.1) _____ use to delete a relation (RDBMS) from a database.(CO1,K1) 1
- (a) delete table RDBMS
- (b) drop table RDBMS
- (c) delete from RDBMS
- (d) drop relation RDBMS
- (1.2) _____ SQL operation is used to combine rows from two or more tables.(CO1,K1) 1
- (a) GROUP BY
- (b) JOIN
- (c) HAVING
- (d) ORDER BY
- (1.3) Global Wait-for graph is used for _____ in Distributed database. 1
 (CO2,K1)
- (a) Handling concurrency control
- (b) Handling failures
- (c) Handling deadlock
- (d) None of these
- (1.4) Query _____ is the activity performed in extracting data from the database. (CO2, K1) 1
- (a) Result
- (b) Inhibition
- (c) System

- (d) Processing
- (1.5) _____ is the interactive shell for MongoDB called? (CO3,K1) 1
- (a) mongosh
(b) mongodb
(c) dbmong
(d) none of the mentioned
- (1.6) Aggregation pipeline was introduced in MongoDB version _____.(CO3, K1) 1
- (a) 2.1
(b) 2.2
(c) 2.4
(d) 3
- (1.7) In an object-oriented database, an object is an instance of a(CO4,K1) 1
- (a) Class
(b) Table
(c) Relationship
(d) Attribute
- (1.8) _____ is a common geometry type used in spatial databases (CO4,K1) 1
- (a) Strings
(b) Integers
(c) Points
(d) Booleans
- (1.9) JSON stands for _____.(CO5,K1) 1
- (a) JavaScript Object-Oriented Notation
(b) JavaScript Object Normalization
(c) JavaScript Object Notation
(d) Java Object Notation
- (1.10) _____ database stores are used to store information about networks, such as social connections.(CO5,K2) 1
- (a) Key-value
(b) Wide-column
(c) Graph
(d) Document

2. Attempt all parts:-

- (2.1) List the different datatypes used in SQL.(CO1,K1) 2
- (2.2) Describe asynchronous replication.(CO2,K1) 2
- (2.3) Explain the command to add data in MongoDB. (CO3,K1) 2
- (2.4) Define GIS. (CO4,K1) 2
- (2.5) Describe common NoSQL databases used in industry with examples.(CO5,K2) 2

SECTION-B

30

Answer any one of the following:-

(3.1)	Explain GROUP BY clause in SQL with example. (CO1,K1)	6
(3.2)	Describe join and its types with suitable example.(CO1,K1)	6
Answer any one of the following:-		
(3.3)	Define the CAP theorem in NoSQL databases. (CO2,K1)	6
(3.4)	Explain the implementation of concurrency control in a distributed database. (CO2,K2)	6
Answer any one of the following:-		
(3.5)	Demonstrate CRUD operations in a database with suitable examples.(CO3,K3)	6
(3.6)	Explain indexing and ordering of datasets in MongoDB with suitable examples. and also explain the difference between find() and aggregate() methods in MongoDB.(CO3,K4)	6
Answer any one of the following:-		
(3.7)	Describe multimedia database and how does it differ from traditional relational databases.(CO4,K4)	6
(3.8)	Compare data warehouse and data mart with example. (CO4,K4)	6
Answer any one of the following:-		
(3.9)	Explain how public key encryption works, and what are some common algorithms used in public key encryption(CO5,K4)	6
(3.10)	Define authorization and explain its role in controlling access to resources.(CO5,K2)	6
<u>SECTION-C</u>		50
4. Answer any <u>one</u> of the following:-		
(4.1)	Describe database constraints and explain their types in a database management system.(CO1,K2)	10
(4.2)	Explain checkpoints, transaction commit points, and their importance in a database system with an example. (CO1,K2)	10
5. Answer any <u>one</u> of the following:-		
(5.1)	Explain the concept of distributed transactions in a distributed database system. Discuss the challenges and techniques involved in ensuring transaction atomicity and consistency across multiple nodes. (CO2, K4)	10
(5.2)	Compare and contrast synchronous and asynchronous data replication techniques in a distributed database system. Discuss their advantages, limitations, and scenarios in which they are most suitable. (CO2,K4)	10
6. Answer any <u>one</u> of the following:-		
(6.1)	Solve these queries using MongoDB commands (CO3,K3)	10
	(i)Write a query to insert a new document into a collection named "products" with fields "name", "price", and "category" using MongoDB?	
	(ii) Write a query to retrieve all documents from the "orders" collection where the "status" field is set to "pending".	
	(iii)Write a query to update the "price" field of all documents in the "products" collection by increasing it by 10%.	
	(iv) Write a query to retrieve all documents from the "students" collection where the "age" field is greater than 20 and the "gender" field is "female".	

- (6.2) Explain document-oriented DB and also describe sharding in MongoDB. Explain the alternatives to MongoDB. (CO3,K4) 10
7. Answer any one of the following:-
- (7.1) Compare spatial database and traditional database and explain Multimedia Database with example.(CO4,K2) 10
- (7.2) Describe document-oriented databases and their characteristics. Discuss their advantages over relational databases for managing unstructured and semi-structured data. Provide examples of use cases for document-oriented databases. (CO4,K4) 10
8. Answer any one of the following:-
- (8.1) Explain the difference between SQL and NoSQL databases and provide an example of a scenario where each type of database would be preferable.(CO5,K4) 10
- (8.2) Explain the importance of standards for interoperability and integration in the database industry. Discuss how web services and technologies like JSON contribute to seamless data exchange and integration between systems. (CO5, K4) 10