Printed Page:- 04 **Subject Code:- ACSML0603**

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

B.Tech

SEM: VI - THEORY EXAMINATION (2023 - 2024)

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-a. _____ commands do we use to delete a relation (RDBMS) from a database.(CO1) 1

(a) delete table RDBMS

(b) drop table RDBMS

(c) delete from RDBMS

(d) drop relation RDBMS

1-b. _____ of temporal data that record when a fact was recorded in a database.(CO1) 1

(a) Enter time

(b) Exit time

(c) Valid time

(d) Transaction time

1-c. _____ refer to the correctness and completeness of the data in a database.(CO2) 1

(a) Data security

(b) Data integrity

(c) Data independence

(d) Data constraint

1-d. _____ maintain transactional integrity and database consistency.(CO2) 1

(a) Triggers
(b) Pointers
(c) Locks
(d) Cursors

1-e. In aggregation pipeline, the _____ pipeline stage provides access to MongoDB queries.(CO3) 1

(a) $catch
(b) $match
(c) $batch
(d) All of the mentioned

1-f. MongoDB provides high _____ with replica sets.(CO3) 1

(a) performance
(b) availability
(c) scalability
(d) none of the mentioned

1-g. In an object-oriented database, an object is an instance of a(CO4) 1

(a) Class
(b) Table
(c) Relationship
(d) Attribute

1-h. _____ is a common geometry type used in spatial databases (CO4) 1

(a) Strings
(b) Integers
(c) Points
(d) Booleans

1-i. _____ is a relational database management system that uses SQL.(CO5) 1

(a) MongoDB
(b) Oracle
(c) Redis
(d) Cassandra

1-j. WSDL stands for (CO5) 1

(a) Web Services Development Language
(b) Web Services Description Language
(c) Web Service Definition Language
(d) Web Standard Development Language

2. Attempt all parts:-

2.a. Explain deadlock. Describe characteristics of deadlock.(CO1) 2

2.b. Describe asynchronous replication.(CO2) 2

2.c.	Explain the data types in MongoDB (CO3)	2
2.d.	Explain the difference between an Object-Oriented Database and Relational Database(CO4)	2
2.e.	Describe "SOAP".(CO5)	2

SECTION-B 30

3. Answer any five of the following:-

3-a.	Discuss the role of checkpoints in database recovery and their impact on system performance.[CO1]	6
3-b.	Explain how two-phase locking handles conflicting lock requests from concurrent transactions(CO1)	6
3-c.	Describe protocols. Explain lock based and time stamp-based concurrency protocol with suitable example.(CO2)	6
3-d.	Describe CAP theorem in NoSQL databases. (CO2)	6
3.e.	Explain the difference between SQL and NoSQL and also explain the differences between find() and aggregate() methods in MongoDB. (CO3)	6
3.f.	Describe multimedia database and how does it differ from traditional relational databases.(CO4)	6
3.g.	Explain why organization choose NoSQL databases over traditional relational databases.(CO5)	6

SECTION-C 50

4. Answer any one of the following:-

4-a.	Describe constraints. Explain types of constraints in database management system.(CO1)	10
4-b.	Explain the concept of query optimization in relational databases. Discuss the importance of query transformations in improving query performance. (CO1)	10

5. Answer any one of the following:-

5-a.	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)	10
5-b.	Explain the concept of concurrency control in distributed databases. Discuss its significance in ensuring data consistency and transactional integrity. Provide examples to illustrate your points.(CO2)	10

6. Answer any one of the following:-

6-a.	Explain document-oriented DB and also describe sharding in MongoDB. Explain the alternatives to MongoDB. (CO3)	10
6-b.	Explain the difference between consistency and eventual consistency in the context of NoSQL with example also describe CRUD operation in MongoDB with example(CO3)	10

7. Answer any one of the following:-

7-a.	Discuss data warehousing as a new database application and architecture. Explain the purpose, components, and benefits of data warehousing in supporting business intelligence and decision-making processes. (CO4)	10
7-b.	Describe the difference between a point, line, and polygon in a spatial database and Discuss the challenges associated with scaling deductive databases to handle large volumes of data.(CO4)	10

8. Answer any <u>one</u> of the following:-

8-a.	Describe some best practices for configuring and managing database audit trails. Discuss the role of data masking in protecting sensitive information in databases.(CO5)	10
8-b.	Discuss the concepts and techniques of data encryption in databases. Explain the benefits and challenges of implementing encryption to protect sensitive data at rest and in transit. (CO5)	10