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 CARRY OVER THEORY EXAMINATION - AUGUST 2023

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. Which of the following is the time 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-b. When dealing with database transactions, there is often a need for multiple users to use a database to perform different operations. In this case, ___ of the database occurs. (CO1) 1

(a) Concurrent Connection

(b) Concurrent Reduction

(c) Concurrent Execution

(d) Concurrent Revolution

1-c. _____ states that only valid data will be written to the database. (CO2) 1

(a) Consistency

(b) Atomicity

(c) Durability

(d) Isolation

1-d. The deadlock state can be changed back to stable state by using _____ statement. (CO2) 1

(a) Commit

(b) Rollback

(c) Savepoint

(d) Deadlock

1-e. NoSQL databases are designed to expand _____. (CO3) 1

(a) with increase of load

(b) vertically

(c) hardware wise

(d) horizontally

1-f. Point out the wrong statement. (CO3) 1

(a) Replication provides redundancy and increases data availability

(b) Replication allows you to recover from hardware failure and service interruptions

(c) With multiple copies of data on different database servers, replication protects a database from the loss of a single server

(d) None of the mentioned

1-g. Which of the following is a common geometry type used in spatial databases? (CO4) 1

(a) Strings

(b) Integers

(c) Points

(d) Booleans

1-h. Which of the following is a characteristic of deductive databases? (CO4) 1

(a) They are schema-less.

(b) They are designed to handle only structured data.

(c) They store data in tables.

(d) They are designed to handle only small amounts of data.

1-i. Which of the following data types is NOT supported by JSON? (CO5) 1

(a) string

(b) integer

(c) boolean

(d) function

1-j. Which of the following is an example of redaction? (CO5) 1

(a) Covering up sensitive information with a black marker

(b) Replacing sensitive information with asterisks

(c) Removing sensitive information from a document

(d) Copying sensitive information to a secure location

2. Attempt all parts:-

2.a. With an example show how a referential integrity can be implemented. (CO1) 2

2.b. What is a 2 phase commit protocol? (CO2) 2

2.c. What is the main target of NoSQL? (CO3) 2

2.d. What is default constraint? (CO4) 2

2.e. What do you mean by database auditing? (CO5) 2

SECTION B **30**

3. Answer any five of the following:-

3-a. Describe procedures in PL/SQL with its advantages and disadvantages. (CO1) 6

3-b. Write a short note on SQL DDL commands. (CO1) 6

3-c. What is CAP theorem in NoSQL databases? (CO2) 6

3-d. How is concurrency control implemented in a distributed database? (CO2) 6

3.e. What is a Document in MongoDB? Explain the collection in MongoDB. (CO3) 6

3.f. What are the limitations of deductive databases? (CO4) 6

3.g. What are SQL based and NoSQL database systems and their associated implications? (CO5) 6

SECTION C **50**

4. Answer any one of the following:-

4-a. Explain the concept of query optimization in relational databases. Discuss the importance of query transformations in improving query performance. (CO1) 10

4-b. Compare and contrast two-phase locking and deadlock prevention as concurrency control mechanisms. Discuss their advantages and limitations. (CO1) 10

5. Answer any <u>one</u> 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. 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) 10

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

6-a. Discuss the techniques and best practices for modifying and managing NoSQL data stores in MongoDB. Include topics such as data modeling, data migration, and backup strategies. (CO3) 10

6-b. Discuss the CAP theorem in the context of distributed databases. Explain the three properties (consistency, availability, and partition tolerance) and how they relate to the design and implementation of distributed systems. (CO3) 10

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

7-a. 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) 10

7-b. 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

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

8-a. 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) 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