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Subject Code:- ACSML0603

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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 (20.....- 20.....)

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. If a transaction does not modify the database until it has committed it is said to use a _____ modification technique. (CO1, K2) 1
- (a) Immediate
- (b) Deferred
- (c) More than one of the mentioned
- (d) None of the mentioned
- 1-b. The system must create a query _____ plan before it can fully evaluate a query. (CO1, K1) 1
- (a) Optimization
- (b) Parser
- (c) Translation
- (d) Evaluation
- 1-c. The relationship between DEPARTMENT and EMPLOYEE is a _____ (CO2, K1) 1
- (a) One-to-one relationship
- (b) One-to-many relationship
- (c) Many-to-many relationship
- (d) Many-to-one relationship
- 1-d. The process of finding a good strategy for processing a query is called (CO2, 1

K1)

- (a) Query optimization
- (b) Query processing
- (c) Query management
- (d) Query cost

- 1-e. Aggregation pipeline was introduced in MongoDB version _____.(CO3, K1) 1
- (a) 2.1
 - (b) 2.2
 - (c) 2.4
 - (d) 3
- 1-f. NoSQL databases is used mainly for handling large volumes of _____ data. (CO3,K1) 1
- (a) Structured
 - (b) Unstructured
 - (c) Semi-structured
 - (d) None
- 1-g. In an object-oriented database, an object can contain: (CO4, K1) 1
- (a) Attributes and methods
 - (b) Rows and columns
 - (c) Keys and indexes
 - (d) Relationships and joins
- 1-h. ETL stand for (CO4, K1) 1
- (a) Effect,transfer and load
 - (b) Explain,transfer and load
 - (c) Extract,transfer and load
 - (d) Extract,transform and load
- 1-i. _____ 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
- 1-j. SOAP stands for (CO5,K1) 1
- (a) Simple Object Access Protocol
 - (b) Service-Oriented Architecture Protocol
 - (c) Secure Open Access Protocol
 - (d) Simple Online Application Protocol

2. Attempt all parts:-

2.a.	Explain SELECT command in SQL with example.(CO1,K1)	2
2.b.	Explain the Distributed Query processing techniques in detail. (CO2, K2)	2
2.c.	How do you Delete a Document in mongodb? (CO3, K3)	2
2.d.	How can a constraint be disabled in a database? (CO4, K3)	2
2.e.	Explain SQL standards, and why are they important in the industry?(CO5,K2)	2

SECTION-B

30

3. Answer any five of the following:-

3-a.	Explain DISTINCT and count() statement with example. (CO1,K2)	6
3-b.	Explain how two-phase locking handles conflicting lock requests from concurrent transactions. (CO1, K3)	6
3-c.	Classify concurrency protocols in distributed database. Explain biased and primary copy protocol with suitable example.(CO2,K4)	6
3-d.	Explain the working of master-slave replication in a distributed database, explain its advantages and disadvantages.(CO2,K2)	6
3.e.	Explain the concept of pipeline in the MongoDB aggregation framework.(CO3, K2)	6
3.f.	Explain the difference between temporal database and traditional database. (CO4, K2)	6
3.g.	Explain how public key encryption works, and what are some common algorithms used in public key encryption(CO5,K4)	6

SECTION-C

50

4. Answer any one of the following:-

4-a.	Explain query optimization in relational databases. Explain the importance of query transformations in improving query performance. (CO1,K3)	10
4-b.	Compare and contrast two-phase locking and deadlock prevention as concurrency control mechanisms. Discuss their advantages and limitations. (CO1, K4)	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, K4)	10
5-b.	Draw the overall structure of distributed database and explain its various components. (CO2, K3)	10

6. Answer any one 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, K4)	10
6-b.	Explain the importance of indexing in MongoDB. Describe how indexes improve query performance and provide examples of scenarios where indexing is beneficial. Write a query to retrieve all documents from the products collection	10

ordered by the price field in ascending order. (CO3,K2)

7. Answer any one of the following:-

- 7-a. Discuss data warehousing as a modern database application and architecture. Explain the purpose, components, and benefits of data warehousing in supporting business intelligence and decision-making processes. (CO4,K2) 10
- 7-b. In a healthcare system, explain how deductive database technology can be used to store patient records, manage medical histories and treatment plans, and support decision-making for diagnosis and treatment. (CO4, K5) 10

8. Answer any one of the following:-

- 8-a. Given a database containing sensitive customer information (e.g., Social Security numbers, credit card details), how would you implement data masking to ensure that only authorized users can view the full data? (CO5,K3) 10
- 8-b. 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

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