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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 (2024 - 2025.)

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. _____ 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-b. A table can be logically connected to another table by defining a _____.(CO1,K1) 1
- (a) Super key
 - (b) composite key
 - (c) Primary key
 - (d) Unique key
- 1-c. The real use of the Two-phase commit protocol is _____. (CO2,K1) 1
- (a) Deadlock will not occur
 - (b) Concurrency control can be avoided
 - (c) Atomicity, i.e, all-or-nothing commits at all sites
 - (d) Ensure atomicity and consistency across multiple nodes
- 1-d. The relationship between DEPARTMENT and EMPLOYEE is _____(CO2,K1) 1
- (a) One-to-one relationship

- (b) One-to-many relationship
 (c) Many-to-many relationship
 (d) Many-to-one relationship
- 1-e. _____ calculates aggregate values for the data in a collection.(CO3,K1) 1
 (a) db.collection.aggregate
 (b) db.collection.agg
 (c) db.collection.pipeline
 (d) all of the mentioned
- 1-f. MongoDB provides high _____ with replica sets.(CO3,K1) 1
 (a) performance
 (b) availability
 (c) scalability
 (d) none of the mentioned
- 1-g. _____ is a benefit of using a temporal database.(CO4,K1) 1
 (a) Improved data security
 (b) Increased data redundancy
 (c) More accurate historical data analysis
 (d) Faster query performance
- 1-h. Multimedia comprises of_____.(CO4,K1) 1
 (a) Audio
 (b) Video
 (c) None of these
 (d) Audio and Video
- 1-i. JSON stands for _____.(CO5,K1) 1
 (a) JavaScript Object-Oriented Notation
 (b) JavaScript Object Normalization
 (c) JavaScript Object Notation
 (d) Java Object Notation
- 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 synchronous replication with example.(CO2,K1) 2
 2.c. Explain Indexing in MongoDB.(CO3,K1) 2

- 2.d. Compare XML and HTML.(CO4,K2) 2
- 2.e. Describe web service.(CO5,K1) 2

SECTION-B

30

3. Answer any five of the following:-

- 3-a. Explain DISTINCT and count() statement with example.(CO1,K1) 6
- 3-b. Explain integrity constraint and its types.(CO1,K1) 6
- 3-c. Explain majority protocol and Quorum consensus protocol in distributed lock manager approach with example. (CO2,K1) 6
- 3-d. Explain the working of master-slave replication in a distributed database, explain its advantages and disadvantages.(CO2,K1) 6
- 3.e. Explain type of indexing with example in MongoDB.(CO3,K1) 6
- 3.f. Describe advantages of using multimedia in education .(CO4,K1) 6
- 3.g. Compare strings and array represented in JSON with example.(CO4,K2) 6

SECTION-C

50

4. Answer any one of the following:-

- 4-a. Explain aggregate functions in SQL with example.(CO1,K1) 10
- 4-b. Describe the shadow paging recovery technique with example . what circumstances does it not requires a log.(CO1,K1) 10

5. Answer any one of the following:-

- 5-a. Compare synchronous and asynchronous replication with example also explain its advantages and disadvantages.(CO2,K2) 10
- 5-b. Explain distributed transaction and its types, and how does it differ from a local transaction.(CO2,K2) 10

6. Answer any one of the following:-

- 6-a. Explain ObjectID in MongoDB with example. Compare SQL and NoSQL with example.(CO3,K2) 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 ordered by the "price" field in ascending order.(CO3,K1) 10

7. Answer any one of the following:-

- 7-a. Explain foreign key constraint in relational databases, and how does it enforce referential integrity.(CO4,K1) 10
- 7-b. Explain the architecture of a typical data warehousing system. Describe the components such as data sources, ETL (Extract, Transform, Load) processes, data warehouse storage, and analytical tools.(CO4,K1) 10

8. Answer any one of the following:-

- 8-a. Explain how SQL databases enforce a structured schema, while NoSQL databases provide flexibility for unstructured or semi-structured data. How do these characteristics impact their use in the industry.(CO5,K2) 10
- 8-b. 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

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