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**Question Paper Code : 10845**

M.C.A. DEGREE EXAMINATIONS, APRIL/MAY 2023.

Second Semester

MC 4202 – ADVANCED DATABASE TECHNOLOGY

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State the minimum conditions to be satisfied for a Distributed database.
2. What are the drawbacks of Two Phase Protocol?
3. Differentiate Deferred consideration and Detached consideration.
4. Define Attribute Versioning.
5. List down the NOSQL characteristics related to data models and query languages.
6. What are the three desirable properties of distributed systems with replicated data?
7. Briefly describe about the three types of XML documents.
8. Indicate the meaning of these notations  $A^+$ ,  $A^*$ ,  $A$ . used in specifying the elements in XML.
9. List down the key differences between databases and IR systems.
10. What are the steps of process involved in searching relevant documents from the Inverted Index, given a set of query terms?

11. (a) Explain in detail about Distributed Concurrency Control Based on (13)

- (i) Distinguished Copy of a Data Item.
- (ii) Distributed Concurrency Control Based on Voting.

Or

(b) (i) Write short notes on the following in distributed databases: (8)

- (1) Transparency
- (2) Availability and Reliability
- (3) Scalability and
- (4) Partition Tolerance
- (5) Autonomy

(ii) Describe about Distributed Query Processing Using Semijoin (5)

12. (a) (i) Explain about Incorporating Time in Relational Databases Using Tuple Versioning. (8)

(ii) Write short notes on Multimedia databases. (5)

Or

(b) (i) Explain how indexing can be done in spatial databases. (7)

(ii) Explain about location and handoff management in Mobile databases. (6)

13. (a) Explain MongoDB Data Model and MongoDB CRUD Operations Under Document-Based NOSQL Systems. (13)

Or

(b) Write short notes on the following: (13)

- (i) Cassandra Query Language
- (ii) Hive Query Language
- (iii) OrientDB Features

14. (a) (i) Explain about the XML Hierarchical Data Model. (8)  
(ii) Write short notes on Specifying Path Expressions in XML. (5)

Or

- (b) (i) Explain about the approaches for organizing the contents of XML documents to facilitate their subsequent querying and retrieval. (7)  
(ii) Write short notes on Specifying Queries in XML with XQuery. (6)
15. (a) (i) Explain the following types of queries in IR: (8)  
(1) Boolean Queries  
(2) Phrase Queries  
(3) Proximity Queries  
(4) Wildcard Queries  
(ii) Write short notes on Analyzing the Link Structure of Web Pages. (5)

Or

- (b) Write short notes on Information Retrieval Models: (13)  
(i) Boolean Model  
(ii) Vector Space Model  
(iii) Probabilistic Model  
(iv) Semantic Model

PART C — (1 × 15 = 15 marks)

16. (a) (i) Examine and find out the appropriate spatial queries that require the use of spatial operations to perform the following operations: (7)  
(1) To find all ambulances within a five mile radius of an accident location  
(2) To find five closest ambulances to an accident location  
(3) To find all homes that are within two miles of a lake

(ii) Investigate the role of IR in the following: (8)

- (1) Social Search
- (2) Conversational Information Access
- (3) Probabilistic Topic Modeling
- (4) Question Answering Systems

Or

(b) Consider COMPANY database with the following fields: (15)

Department, Employee, Project, Address, worker, Dependent

Illustrate the features of XML schema in a step-by-step manner referring to

The XML schema document corresponding to the database

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