No. of Printed Pages : 4

Sl. No.

B2.3-R5 : ADVANCED DATABASE TECHNOLOGIES

DURATION : 03 Hours **MAXIMUM MARKS : 100**

Roll No. : | | | | | | |

Answer Sheet No. : | | | | | | |

Name of Candidate : _____ **; Signature of Candidate :** _____

INSTRUCTIONS FOR CANDIDATES :

- Carefully read the instructions given on Question Paper, Answer Sheet.
- Question Paper is in English language. Candidate has to answer in English Language only.
- **Question paper contains Seven questions. The Question No. 1 is compulsory. Attempt any FOUR Questions from Question No. 2 to 7.**
- **Parts of the same question should be answered together and in the same sequence.**
- **Questions are** to be answered in the **ANSWER SHEET** only, supplied with the Question Paper.
- **Candidate cannot leave the examination hall/ room without signing on the attendance sheet and handing over his/her Answer Sheet to the Invigilator. Failing in doing so, will amount to disqualification of Candidate in this Module/Paper.**
- After receiving the instruction to open the booklet and before answering the questions, the candidate should ensure that the Question Booklet is complete in all respects.

DO NOT OPEN THE QUESTION BOOKLET UNTIL YOU ARE TOLD TO DO SO.

1. (a) Explain the selection and projection operations in relational algebra in detail.

(b) What is a transaction ? Explain the ACID Properties of transactions.

(c) How can you prevent SQL injection attacks ?

(d) What is the ETL Process? Why is it used in a Data Warehouse ?

(e) What is spatial database? Explain in detail.

(f) What is Object Relational Database System ? Explain in detail.

(g) Construct an E-R diagram for a car insurance company whose customers own one or more cars each. Each car has associated with it zero to any number of recorded accidents. Each insurance policy covers one or more cars, and has one or more premium payments associated with it. Each payment is for a particular period of time, and has an associated due date, and the date when the payment was received.

(7x4)

2. (a) What is normalization ? Explain the importance of normalization in database design. What are the conditions required for a relation to be in 2NF and 3NF ? Explain with examples.

(b) Describe three-tier database architecture and its advantages. Provide examples of how it is used in real-world applications.

(c) What is MongoDB and MariaDB ?

(8+6+4)

3. (a) What are the insider threats in database security, and how can they be mitigated ?

(b) What are log records in a database system ? Describe the types of log records and their role in crash recovery.

(c) What are stored procedures, and what are their advantages ?

(6+6+6)

4. (a) Explain a database trigger. What are the advantages of using triggers ?

(b) What is concurrency control ? Discuss Two phase locking with a suitable example.

(c) What is Deadlock ? Explain the methods to handle deadlocks in database transactions.

(6+6+6)

5. (a) What is the relationship between Database Writer and Buffer Cache ?

(b) What is a Rollback Segment ? How do Rollback Segments ensure Read Consistency ?

(c) What is Recovery Mechanism ? Explain Log-Based Recovery.

(4+6+8)

6. (a) What is Data Warehouse ? Explain Data Cleaning Process in Data Warehousing.

(b) What is a Data Cube ? Explain the characteristics of a data warehouse.

(10+8)

7. (a) What are Object-oriented databases ? Explain the need of Object-oriented databases.

(b) What is fragmentation in the distributed database ? Explain the advantages and disadvantages of fragmentation.

(9+9)

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SPACE FOR ROUGH WORK