(T) Roll No. .....

PAPER ID—11453

Bachelor of Technology in Computer Science and Engineering (Artificial Intelligence) EXAMINATION, 2025

(Sixth Semester)

ADVANCED DATABASE MANAGEMENT SYSTEM

Professional Elective Course-III

Time : 3 *Hours* *Maximum Marks :* 70

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. **1** is compulsory. All questions carry equal marks.

1. (a) What is a three-tier database architecture ? Mention any *two* advantages of using a DBMS. 2

(b) What is a Relational database management system ? State two disadvantages of relational databases. 2

(c) What is query processing in a DBMS ? Name any *two* general strategies for query processing. 2

(d) Write a SQL query to find all employees with salary greater than 50,000. 2

(e) What are the ACID properties of a Transaction ? 2

(f) What is the role of buffer management in DBMS ? 2

(g) What is the difference between Object oriented DBMS and Distributed DBMS ? 2

Unit I

2. (a) Explain the three-tier architecture of DBMS with a neat diagram. Discuss the advantages of this architecture. 7

(b) Compare different types of data models (hierarchical, network and relational) with suitable examples. 7

3. (a) What is Normalization ? Explain 1NF, 2NF, and 3NF with examples. Why is normalization important ? 7

(b) Describe the components of a query processor. Explain the role of the query compiler and query evaluator. 7

Unit II

4. (a) Define Serializability. Explain conflict and view serializability with examples. 7

   (b) What is a deadlock ? How is it detected, prevented and resolved in DBMS ? 7

5. (a) What is concurrency control ? Why is it important in DBMS ? 7

   (b) What do you understand by locking protocol ? Explain the Two-Phase Locking (2PL) protocol with an example. 7

Unit III

6. Explain the different types of data fragmentation (horizontal, vertical, hybrid) used in distributed databases. 14

7. What is a distributed deadlock ? Discuss commit protocols in distributed transactions. 14

Unit IV

8. (a) Discuss specialization, generalization and aggregation in object-oriented data modeling. 7

   (b) Explain the structure and components of an object-oriented database system architecture. 7

9. (a) Define specialization and generalization. Give one example of each using a class diagram. 7

   (b) What is aggregation in object-oriented modeling ? How is it different from association ? 7

