

Register No.: Name:

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

SECOND SEMESTER MCA DEGREE EXAMINATION (R), MAY 2023**(2021 SCHEME)****Course Code: 21CA201****Course Name: Advanced Database Management Systems****Max. Marks: 60****Duration: 3 Hours****PART A****(Answer all questions. Each question carries 3 marks)**

1. Differentiate data redundancy and data inconsistency.
2. What is a recursive relationship?
3. Define functional dependency. Why are some functional dependencies trivial?
4. Given a relation R with 5 attributes ABCDE and the following functional dependencies:
A → B, BC → E, and ED → A.
Is R in 3NF? Justify.
5. Illustrate lost update problem with an example.
6. What is database recovery? Explain.
7. Distinguish between primary and secondary indexing.
8. What is bucket overflow? Explain the reasons of occurring bucket overflow.
9. Differentiate homogeneous and heterogeneous databases.
10. Compare and contrast HBase and Cassandra.

PART B**(Answer one full question from each module, each question carries 6 marks)****MODULE I**

11. a) How does DBMS provide data abstraction? Explain. (3)
b) Explain the symbols used in ER diagram. (3)

OR

12. Consider the following relational schema
Member (mem_no, Name, Office, Age)
Books (ISBN, Title, Authors, Publisher)
Loan (mem_no, ISBN, Date) (6)
Write the following queries in relational algebra.
a) Find the names of members who have borrowed a book published by McGraw-Hill.
b) Find the names of members who have borrowed more than five

different books published by McGraw-Hill.

- c) For each publisher, find the names of members who have borrowed the books.

MODULE II

13. a) Does 3NF allow redundancy? Justify your answer. (3)
b) Demonstrate transitive dependency with an example. (3)

OR

14. What is multi-valued dependency? State and explain fourth normal form based on this concept. (6)

MODULE III

15. List and explain various issues while transactions are running concurrently in DBMS. (6)

OR

16. What is 2-phase locking protocol? Compare 2-phase locking with strict 2-phase locking protocol. (6)

MODULE IV

17. Discuss the different levels of RAID with a diagram. (6)

OR

18. Is B+ tree, a multi-level indexing? How does it differ from B-tree? (6)

MODULE V

19. a) Define distributed database system. (2)
b) Explain complex datatypes in SQL. (4)

OR

20. a) Discuss the CAP theorem in the distributed database system. (3)
b) Explain about data replication in MongoDB. (3)
