Avinashilingam Institute for Home Science and Higher Education for Women

Deemed to be University Estd. u/s 3 of UGC Act 1956, Category A by MHRD (now MoE)
Re-accredited with A++ Grade by NAAC. CGPA 3.65/4, Category I by UGC
Coimbatore - 641 043, Tamil Nadu, India

Bachelor's Degree Examination – November 2025
V Semester

Class : III UG | **Time: 3 Hours**
Major : Computer Science | **Max. Marks: 100**

23BCSC09 Database Management Systems

Course Outcomes :

CO1: Obtain knowledge to model databases using ER diagram and creating schema.

CO2: Develop query processing skills and normalization of databases.

CO3: Acquire knowledge on Indexing and Concurrency Control.

CO4: Trained skill to solve problems in Database Programming.

CO5: Gain knowledge in Big Data concepts.

Part A **10 x 1 = 10**
Choose the Correct Answer

1. Which of the following is not a DBMS software ? CO1K1
   a. Oracle b. MySQL
   c. MS Word d. PostgreSQL

2. The property of a transaction that ensures "all or nothing" execution is: CO1K2
   a. Atomicity b. Consistency
   c. Isolation d. Durability

3. Which SQL command is used to remove a table ? CO2K2
   a. DELETE b. REMOVE
   c. DROP d. ERASE

4. A foreign key is used to : CO2K1
   a. Uniquely identify tuples b. Link two tables
   c. Store images d. Speed up queries

5. Indexing in a database is used to : CO3K1
   a. Reduce storage space b. Speed up retrieval
   c. Increase redundancy d. Improve security

6. In SQL, COUNT (*) returns : CO3K2
   a. Sum of all values b. Number of rows
   c. Maximum value d. Average value

7. Which of the following is an example of NoSQL database ? CO4K1
   a. MongoDB b. Oracle
   c. MySQL d. PostgreSQL

8. The result of a Cartesian Product between two relations R and S with m and n tuples is: CO4K2
   a. m + n b. m × n
   c. m – n d. n ÷ m

9. In Big Data, the three V's stand for : CO5K1
   a. Volume, Velocity, Variety b. Version, Value, Validity
   c. Value, Visualization, Volume d. Variety, Validation, Version

10. In SQL, which command is used to handle exceptions ? CO5K2

Part B 5 x 6 = 30

Answer all questions

Each answer should not exceed 400 words or two pages

11.a. Demonstrate the ER Model with an example. CO1K1

(or)

11.b. Discriminate primary key, foreign key, and candidate key with examples. CO1K2

12.a. Construct an SQL query to display the top 3 highest salaried employees from the Employee table. CO2K1

(or)

12.b. Breakdown the difference between DELETE, TRUNCATE, and DROP with examples. CO2K2

13.a. Generalize different types of database indexing techniques with diagrams. CO3K1

(or)

13.b. Demonstrate how a B+ Tree index works with a sample dataset. CO3K2

14.a. Formulate a SQL program to calculate the factorial of a number using a loop. CO4K1

(or)

14.b. Paraphrase the advantages and disadvantages of stored procedures in DBMS. CO4K2

15.a. Enumerate the characteristics of Big Data? Explain with examples from real-world applications. CO5K1

(or)

15.b. Categorize Hadoop Distributed File System (HDFS) with a traditional RDBMS system. CO5K2

Part C 5 x 12 = 60

Answer all questions

Each answer should not exceed 800 words or four pages

16.a. Integrate an ER diagram for a University Database to manage students, courses, and faculty. Convert it into relational schemas with proper constraints. CO1K1

(or)

16.b. Normalize the following relation up to 3NF: CO1K2
STUDENT (StudID, Name, CourseID, CourseName, Instructor, InstructorPhone)

17.a. Construct SQL queries for the following : CO2K1

i. Display the names of employees who earn more than the average salary.
ii. Find the department with the maximum number of employees.
iii. Retrieve employees who do not have a manager.

(or)

17.b. Explain nested queries and joins with suitable examples. CO2K2

18.a. Analyze the performance difference between clustered and non-clustered indexing with examples. CO3K1

(or)

18.b. A company wants to implement a hash-based index. Predict the design and analyze its pros and cons compared to tree-based indexing. CO3K2

19.a. Simulate a SQL program to manage a Library System with procedures to :

i. Insert new books ii. Borrow a book (reduce stock)
iii. Return a book (increase stock) CO4K1

(or)

19.b. Critically evaluate the security and transaction management features of DBMS. CO4K2

20.a. Big Data is often described as a paradigm shift from traditional databases. Justify this statement with architecture, tools, and use cases. CO5K1

(or)

20.b. Propose a Big Data solution for analyzing social media data to identify trending topics. Explain how the system processes large volumes of unstructured data. CO5K2