

403/Comp.Sc(N)

UG/4th Sem/CS-MN-T-2/25

U.G. 4th Semester Examination - 2025

COMPUTER SCIENCE

[MINOR]

Course Code : CS-MN-T-2

(Data Management Systems)

[NEP-2020]

Full Marks : 25

Time : 2 Hours

The figures in the right-hand margin indicate marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP-A

1. Answer any **five** questions: 1×5=5
- a) What is database schema?
 - b) What is a weak entity?
 - c) What is a candidate key?
 - d) What does SELECT * do in SQL?
 - e) Define functional dependency.
 - f) Name two types of file organization used in RDBMS.
 - g) What is query optimization?
 - h) Mention one difference between B Tree and B+ Tree.

[Turn over]

GROUP-B

2. Answer any **two** questions: $5 \times 2 = 10$
- a) Explain with diagram the three-schema architecture of DBMS. Define DDL and DML. $3+2$
 - b) Explain selection and projection operation in relational algebra with examples. Explain natural join operation with an example. $3+2$
 - c) What is normalization? Explain Boyce-Codd Normal Form (BCNF) and Fourth Normal Form (4NF) with examples. $1+4$
 - d) Write down the ACID properties in database transaction. Define two phase locking protocol. $4+1$

GROUP-C

3. Answer any **one** question: $10 \times 1 = 10$
- a) Define key attribute and derived attribute in ER model. What is cardinality of a relation? Explain different types of cardinalities in ER model. $4+2+4$
 - b) Consider the following relational schema:
Department (DepartmentID, DepartmentName)
Student (StudentID, Name, Age, CourseID)
Courses (CourseID, Name, Description, DepartmentID, Credit)

Perform the following:

2×5=10

- i) Write a SQL statement to insert a tuple in Student table.
 - ii) Find the names and ages of students enrolled in CourseID 'C101' using SQL.
 - iii) Write a query in relational algebra to get CourseID and Name of all courses with more than 3 credits.
 - iv) Display student name and the name of the course they are enrolled in using SQL.
 - v) List the names of all courses offered by the 'Computer Science' department using relational algebra.
- c) Write short notes on any **two** of the following:

5×2=10

- i) Advantages of DBMS over file system
 - ii) Specialization and Generalization
 - iii) Clustered Indexing and Multilevel Indexing
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