

U.G. 4th Semester Examination - 2024**COMPUTER SCIENCE****[HONOURS]****Generic Elective Course (GE)****Course Code : COM.SC-H-GE-L-202****[Database Management System (DBMS)]****Full Marks : 40****Time : 2½ 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: 2×5=10
- a) What is the difference between 'logical data independence' and 'physical data independence'?
 - b) What is the 'HAVING' clause in SQL, and how does it differ from 'WHERE'?
 - c) Explain the concept of 'database isolation levels'.
 - d) What is 'denormalization' in a database, and why might it be used?
 - e) What is a primary key?

[Turn over]

- f) Define a database schema.
- g) What is a table in a database?
- h) What do you mean by relational integrity constraint?

GROUP-B

2. Answer any two questions: $5 \times 2 = 10$
- a) Compare and contrast the hierarchical data model and the network data model, highlighting their advantages and disadvantages. 5
 - b) Explain the following basic operations of relational algebra with examples: selection (σ), projection (π), and Cartesian product ($\times$). 5
 - c) Provide an example of an SQL SELECT statement using WHERE, GROUP BY, and HAVING clauses. Explain each part of the query. 5
 - d) Describe the three levels of DBMS architecture. How do they interact with each other? 5

GROUP-C

- Answer any two questions: $10 \times 2 = 20$
3. Describe how to handle different types of relationships (one-to-one, one-to-many, many-to-many) during the ER to relational mapping process. Provide examples for each type of relationship. 5+5

4. Define functional dependency in the context of relational databases. Why are functional dependencies important in database design? Define the first normal form (1NF). What are the requirements for a relation to be in 1NF? $3+2+2+3$

5. Define and explain the following types of relational constraints: domain constraints, entity integrity constraints, and referential integrity constraints. What are candidate keys, and how do they differ from primary keys? Provide an example to support your explanation. $5+3+2$

6. Write short notes on any two of the following: $5 \times 2 = 10$

- a) SQL queries
- b) Enhanced ER Model
- c) DBMS architecture