

Duration: 3 Hours

[Max Marks:80]

- N.B. : (1) Question No 1 is Compulsory.
 (2) Attempt any three questions out of the remaining five.
 (3) All questions carry equal marks.
 (4) Assume suitable data, if required and state it clearly.

1

- a What are the responsibilities of a Database Administrator (DBA)? [5]
 b Differentiate between Strong and Weak Entity. [5]
 c Explain the aggregate/group functions in SQL with examples. [5]
 d Explain the GROUP BY and HAVING clause in SQL with an example. [5]

2

- a Draw and explain the overall system structure of DBMS. [10]
 b Design an ER diagram for a Hospital Management System and convert it into a relational schema. [10]

3

- a Explain various JOIN types (INNER, LEFT OUTER, RIGHT OUTER, FULL OUTER) with SQL syntax and output examples. [10]
 b Explain different relational algebra operators with examples. [10]

4

- a Explain Conflict Serializability in concurrency control. [10]
 b What is Normalization? Explain 1NF, 2NF, and 3NF. [10]

5

- a Explain the concept of Transactions and ACID Properties. [10]
 b What are the recovery techniques in DBMS? Discuss log-based recovery. [10]

6

- a What is Indexing in DBMS? Explain clustered and non-clustered indexing with examples. [10]
 b Write a JDBC program to retrieve and display data from a database table. [10]