

(Time: 2½ hours)

Total Marks: 75

- N. B.: (1) **All** questions are **compulsory**.
 (2) Make **suitable assumptions** wherever necessary and **state the assumptions** made.
 (3) Answers to the **same question** must be **written together**.
 (4) Numbers to the **right** indicate **marks**.
 (5) Draw **neat labeled diagrams** wherever **necessary**.
 (6) Use of **Non-programmable** calculators is **allowed**.

1. Attempt any three of the following:

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- Write the disadvantages of file processing system.
- Discuss any two applications where database management system can be used.
- Write a short note on business rules.
- What is the importance of data model?
- Explain the concept of weak entity set.
- Write various symbols and their meaning used to draw ER diagram.

2. Attempt any three of the following:

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- What do you mean by decomposition? Write the desirable properties of decomposition.
- Compare BCNF and 3NF.
- List aggregate functions of relational algebra. Explain with example.
- Explain the following relational algebra operations.
 - Rename
 - Cartesian product
- Write a formal definition of domain relational calculus. Explain with example.
- Write a short note on tuple relational calculus.

3. Attempt any three of the following:

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- Write a short note on views.
- Discuss the importance of triggers in SQL.
- What do you mean by integrity constraint? Explain with example.
- List various set operations of SQL. Explain any two with example.
- Consider the schema where the primary keys are underlined.
 employees (E_id, name, address, hire_date, birth_date)
 department (dept_id, name, year_of_establishment)
 emp_dept (E_id, dept_id, from_date, to_date)
 salaries (E_id, salary, month, year)
 Construct the following SQL queries for this relational database.
 - List all the employees of IT department.
 - Delete employee whose name is 'ABC'.
 - List all departments in which at least one employee gets salary > 50000.
 - List all the departments that established in the year 2000.
 - Update the salary of employee to 20000 whose id is 'E001' for April 2018.
- Write SQL DDL corresponding to the schema in Q.3 e. Make any reasonable assumptions about data types, and be sure to declare primary and foreign keys.

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4. Attempt any three of the following:

- Discuss ACID properties.
- Draw state diagram of transaction. Explain in short.
- Explain the timestamp-ordering protocol.
- Write a note on conflict serializability.
- What is deadlock? Explain deadlock prevention.
- What do you mean by concurrent execution? Write the advantages of the same.

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5. Attempt any three of the following:

- What is implicit cursor? Write implicit cursor attribute.
- With example explain the conditional control in PL/SQL.
- Write a PL/SQL function that returns the factorial of a number.
- What is package in PL/SQL? Explain with example.
- What is a procedure/function? Differentiate between procedure and function.
- What is exception? Explain exception handling in PL/SQL.

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