## Bachelor of Computer Applications 4ᵗʰ Semester

### 1048

## DATABASE MANAGEMENT SYSTEM

### Paper–BCA-16-405

**Time Allowed : Three Hours]**  **[Maximum Marks : 65**

**Note :—** Attempt **five** questions in all, including Q. **9** in Section-E, which is compulsory and taking **one** each from Sections A, B, C & D.

### SECTION—A

1.  Explain with a diagram the architecture of a DBMS. Why would you choose a database system instead of simply storing data in flat files ? When would it make sense not to use Database system ?  13

2.  Construct an E-R diagram for a COMPANY database with the following requirements :

   The company is organized into DEPARTMENTs. Each department has a unique name, unique number and an employee who manages the department. We keep track of the start date of the department manager. The department may have several locations. We store each EMPLOYEE's social security number, address,

salary, gender and DOB. Each employee works for one department. We also keep track of the direct supervisor of each employee. Each employee may have a number of DEPENDENTs. For each dependent, we keep track of their name, gender, DOB and relationship to employee. Give each step in the construction of E-R diagram. 13

## SECTION—B

3. (a) Give an example of a relation that is in second normal form but not in third normal form. List all functional dependencies. Explain why it is in 2NF and not in 3NF.

   (b) What is the significance of decomposition ? Discuss the two properties of decomposition. 7,6

4. (a) What is functional dependency ? Why some functional dependencies are called trivial ?

   (b) Provide an overview of Hierarchical data model with examples. 7,6

## SECTION—C

5. (a) Discuss the various DDL and DML commands with illustrations in SQL.

   (b) Describe DROP TABLE command of SQL with both the options–CASCADE and RESTRICT, taking examples. 7,6

6. Explain the following in SQL with examples :

   (a) COMMIT and ROLLBACK.

   (b) Aggregate functions. 7,6

## SECTION—D

7. Consider the following relations :—

    Sailors (sid, sname, rating, age)

    Boats (bid, bname, color)

    Reserves (sid, bid, day).

    Write the following queries in SQL. No duplicates should be printed in any of the answers :

    (a) Display the details of sailors who have reserved a red and a green boat.

    (b) Find the age of the sailors whose name begins and ends with 'B' and has at least four characters.

    (c) Find the names of sailors with a rating of 10.          13

8. Write short notes on the following in the context of PL/SQL :

    (a) Database triggers

    (b) Exception handling.                                     7,6

## SECTION—E

## (Compulsory Question)

9. (a) Differentiate logical data independence and physical data independence.

    (b) How can we identify weak entity ? Explain with an example.

    (c) Compare the different joins in relational algebra.

    (d) Discuss the strengths and weaknesses of the trigger mechanism.

    (e) What is super key and candidate key ? Explain with examples.

    (f) What is a nested query ? Give an example.     5×2, 3=13