Professional Course Examination, May 2019

(4th Semester)

BACHELOR OF COMPUTER APPLICATIONS

Paper : BCA–402

(Database Management Systems)

Full Marks : 75

Time : 3 hours

(PART : A—OBJECTIVE)

(Marks : 25)

The figures in the margin indicate full marks for the questions

SECTION—A

(Marks : 15)

Tick (✓) the correct answer in the brackets provided :   1×10=10

1. A collection of data designed to be used by different people is

(a) database   (   )

(b) DBMS   (   )

(c) RDBMS   (   )

(d) None of the above   (   )

2. Which of the following is a time-dependent constraint?

    (a) Type   ( )

    (b) Range   ( )

    (c) Relationship   ( )

    (d) Temporal   ( )

3. Which of the following is an attribute that represents a value that is derivable from the value of a related attribute or set of attributes, not necessarily in the same entity?

    (a) Single-valued   ( )

    (b) Multi-valued   ( )

    (c) Atomic   ( )

    (d) Derived   ( )

4. The subclasses are also connected to the circle by

    (a) dotted lines   ( )

    (b) single lines   ( )

    (c) double lines   ( )

    (d) All of the above   ( )

5. Which of the following is the most common relationship in the relational database model?

    (a) One-to-one relationship   ( )

    (b) One-to-many relationship   ( )

    (c) Many-to-many relationship   ( )

    (d) All of the above   ( )

6. Which of the following is not procedural language?

(a) Relational Calculus ( )

(b) SQL ( )

(c) Relational Algebra ( )

(d) All of the above ( )

7. Which of the following is not comparison operator?

(a) = ( )

(b) AND ( )

(c) LIKE ( )

(d) BETWEEN ( )

8. How many tables can be joined to create a view?

(a) 1 ( )

(b) 2 ( )

(c) Database dependent ( )

(d) 3 ( )

9. A statement after which you cannot issue a COMMIT command is

(a) SELECT ( )

(b) INSERT ( )

(c) DELETE ( )

(d) UPDATE ( )

10. The process of restoring a database to the correct state in the event of a failure is

(a) database backup ( )

(b) database recovery ( )

(c) concurrency control ( )

(d) data integrity ( )

State whether the following statements are *True (T)* or *False (F)* by putting a Tick (✓) mark in the brackets provided : 1×5=5

1. A schema separates the physical aspects of data storage from the logical aspects of data representation.

(T / F)

2. An OODBMS does not allow for fully integrated databases that hold data, text, pictures, voice and video.

(T / F)

3. A table with five columns has a degree of four.

(T / F)

4. The primary key value of each row in a table need not be unique.

(T / F)

5. Denormalization of frequently performed operations or calculations can be used to improve performance.

(T / F)

SECTION—B

(*Marks* : 10)

Answer the following questions :   2×5=10

1. What are the roles of data dictionary?

2. How can a weak entity set be converted into strong entity set?

3. Define candidate key.

4. How do we use 'SELECT *' in join?

5. What is the use of REVOKE command?

(PART : B—DESCRIPTIVE)

(Marks : 50)

The figures in the margin indicate full marks for the questions

1. (a) Explain the components of typical Database Management Systems (DBMS). 6

   (b) What are the roles and functions of Database Administrator (DBA)? 4

   OR

   (c) Elaborate the three-level architecture of database system. 10

2. (a) Describe the twelve rules of Codd's for a relational database. 10

   OR

   (b) Write a short note on Generalization. 5

   (c) Explain the naming conventions in design of Entity Relationship Model. 5

3. (a) What is Normal Form? Explain the steps to normalization up to Boyce Codd Normal Form (BCNF). 2+8=10

   OR

   (b) What is relational algebra? Explain the different types of relational algebra operations. 6

   (c) Suppose that we decompose the schema $R = (A, B, C, D, E)$ into (A, B, C) and (A, D, E). Show that this decomposition is a lossless-join decomposition, if the following set of functional dependencies holds—$F = \{A \rightarrow BC, CD \rightarrow E, B \rightarrow D, E \rightarrow A\}$. 4

4. (a) Elucidate the different data types which are supported by SQL. 10

   OR

   (b) Write short notes on—Data Definition Language (DDL), Data Manipulation Language (DML) and Data Control Language (DCL) with proper commands and examples. 6

   (c) Explain the INSERT and UPDATE anomalies with examples. 4

5. *(a)* State the usage of *(i)* checkpoint, *(ii)* log file and *(iii)* timestamp mechanisms.   6

(b) Differentiate between immediate and deferred update recovery techniques.   4

OR

(c) Describe the different dimensions of database security.   10