IV/BCA/402

2 0 1 6

(4th Semester)

BACHELOR OF COMPUTER APPLICATIONS

Paper No. : BCA–402

(**Database Management System**)

(New Course)

Full Marks : 75

Time : 3 hours

(PART : B—DESCRIPTIVE)

(*Marks* : 50)

The figures in the margin indicate full marks for the questions

1. *(a)* Write and explain five characteristics of data in a database.   5

     (b) What is data model? Explain different categories of data model.   5

Or

(c) Explain three-schema architecutre by giving a suitable diagram.   5

(d) Differentiate between database and database management system. What are the major components of DBMS?   5

2. (a) What is an attribute? Write and explain two types of attributes.   4

(b) Explain the following and write the notation diagram for each :   6

(i) Weak entity type

(ii) Relationship

(iii) Total participation

Or

(c) Explain the disjointness constraint and participation constraint by giving a suitable example and diagram.   6

(d) Explain the following :   4

(i) Domain constraint

(ii) Key constraint

3. (a) State the 2nd normal form by giving a suitable example. 4

(b) EMPLOYEE (NAME, <u>SSN</u>, BDATE, ADDRESS, SALARY, DNO)

Specify the following queries in relational algebra expression from the above relational schema : 6

(i) List all employees whose salary is greater than 5,000.

(ii) List the NAME and SSN of all employees whose DNO is 5 and live in Aizawl.

(iii) Select the tuples for all employees who either work in department 8 and make over 50,000 per year, or work in department 1 and make over 40,000.

Or

(c) State the Boyce-Codd normal form by giving a suitable example. 4

(d) Differentiate between Universal Quantifier and Existential Quantifier by giving a suitable example. 4

(4)

(e) Explain Cartesian product in relational algebra by giving example.   2

4. *(a)* Write SQL queries for the following :   10

     (i) Create a table called EMPLOYEES with attributes Employee_Id, Name, Father's Name, Age, Salary, Address, Sex, DOB, Department_Number. Set Employee_Id as primary key.

     (ii) Select all employees from EMPLOYEE table whose name is 'John' and lives in Aizwal.

     (iii) Retrieve the Name and Father's Name of employees in department 5 whose salary is between 30,000 and 40,000.

     (iv) Add a new column 'Height' to the EMPLOYEE table you have created.

     (v) Delete the column 'Age' from the EMPLOYEE table.

Or

(b) Consider the EMPLOYEE table and write the output after executing

the following SQL queries : 8

EMPLOYEE										
Fname	Minit	Lname	Ssn	Bdate	Address	Sex	Salary	Super_ssn	Dno
John	B	Smith	123456789	1965-01-09	731 Fondren, Houston, TX	M	30000	333445555	5
Franklin	T	Wong	333445555	1955-12-08	638 Voss, Houston, TX	M	40000	888665555	5
Alicia	J	Zelaya	999887777	1968-01-19	3321 Castle, Spring, TX	F	25000	987654321	4
Jennifer	S	Wallace	987654321	1941-06-20	291 Bery, Bellaire, TX	F	43000	888665555	4
Ramesh	K	Narayan	666884444	1962-09-15	975 Fire Oak, Humble, TX	M	38000	333445555	5
Joyce	A	English	453453453	1972-07-31	5631 Rice, Houston, TX	F	25000	333445555	5
Ahmad	V	Jabbar	987987987	1969-03-29	980 Dallas, Houston, TX	M	25000	987654321	4
James	E	Borg	888665555	1937-11-10	450 Stone, Houston, TX	M	55000	NULL	1

(i) SELECT ALL Salary
FROM EMPLOYEE;

(ii) SELECT DISTINCT Sex
FROM EMPLOYEE;

(iii) SELECT count(*)
FROM EMPLOYEE;

(iv) SELECT Ssn, Address
FROM EMPLOYEE
WHERE Dno=5 AND Lname='Smith'
ORDER BY Dno;

(c) What are SQL views? 2

5. (a) Write and explain different causes of database failure. 5

(b) Explain the concept of shadow paging. 5

Or

(c) Explain different types of requirement to achieve security in database. 4

(d) Explain the following : 6

(i) Data integrity

(ii) Entity integrity

(iii) Referential integrity

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(4th Semester)

BACHELOR OF COMPUTER APPLICATIONS

Paper No. : BCA–402

(Database Management System)

(New Course)

(PART : A—OBJECTIVE)

(Marks : 25)

The figures in the margin indicate full marks for the questions

SECTION—I

(Marks : 15)

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

    1. A database management system is a collection of related data.

                                    (T / F)

    2. A relationship is an association between attributes.

                                      (T / F)

3. A key is a Minimal SuperKey.

(T / F)

4. SQL was introduced by Microsoft.

(T / F)

5. A DBMS used to keep a transaction log to record the changes made to the database.

(T / F)

II. Put a Tick (✓) mark against the correct answer in the brackets provided : 1×10=10

1. The data in the database at a particular moment in time is called

(a) database schema ( )

(b) database state ( )

(c) metadata ( )

(d) data model ( )

2. Logical data independence states that

   (a) the changes in conceptual level schema should not affect the external level schemas   (   )

   (b) the changes in physical level schema should not affect the schema at conceptual level   (   )

   (c) the changes in physical level schema should not affect the external level schemas   (   )

   (d) the changes in conceptual level schema should not affect the physical level schemas   (   )

3. ER model is a

   (a) conceptual data model   (   )

   (b) representational data model   (   )

   (c) physical data model   (   )

   (d) hierarchical data model   (   )

4. The process of defining a set of subclasses of an entity type is called

   (a) generalization   (   )

   (b) attributes   (   )

   (c) specialization   (   )

   (d) EER model   (   )

(4)

5. _____ states that the domain of an attribute must include only atomic values.

   (a) 1st Normal form   (   )

   (b) 2nd Normal form   (   )

   (c) 3rd Normal form   (   )

   (d) BCNF   (   )

6. The set operation that produces a new element by combining every member (tuple) from one relation (set) with every member (tuple) from the other relation (set) is

   (a) EQUI JOIN   (   )

   (b) CARTESIAN PRODUCT   (   )

   (c) UNION   (   )

   (d) INTERSECTION   (   )

7. An SQL is a

   (a) Data Definition Language   (   )

   (b) Data Manipulation Language   (   )

   (c) View Definition Language   (   )

   (d) All of the above   (   )

8. A set of commands to post queries, insert new tuples, and update/delete existing tuples are called as

   (a) DDL   (   )

   (b) DML   (   )

   (c) VDL   (   )

   (d) SDL   (   )

9. The person who is responsible for the management of the database is called

   (a) Database user   (   )

   (b) Application Developer   (   )

   (c) Network Administrator   (   )

   (d) Database Administrator   (   )

10. The update technique that do not physically update the database on disk until after a transaction reaches its commit point is

   (a) immediate update   (   )

   (b) checkpointing   (   )

   (c) deffered update   (   )

   (d) rollback   (   )

(6)

SECTION—II

(*Marks* : 10)

III. Answer the following questions :   2×5=10

1. Write four advantages of using a database.

2. Differentiate between candidate key and primary key.

3. Distinguish between relational algebra and relational calculus.

4. List four data types that are allowed for SQL attributes.

5. What is checkpointing?

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