[Total No. of Questions - 9] [Total No. of Printed Pages - 4]
(2067)

17065(M)

B. Tech 4th Semester Examination

Database Management System (CBS)

CS-401

Time : 3 Hours **Max. Marks : 60**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Candidates are required to attempt five questions in all selecting one question form each of the sections A, B, C and D. Section E with all its subparts is compulsory.

SECTION - A

1. (a) What is the significance of data independence in Database Management? How does logical data independence differ from logical data independence? (6)

   (b) Explain the roles of a database administrator (DBA). Differentiate between DDL and DML and which out of these two belongs to the role of a DBA? (6)

2. (a) Draw and explain complete ER diagram of an online mobile phone shop. Elaborate on the design of a database schema and justify the role of ER diagram in the same. (6)

   (b) What are the disadvantages of conventional file processing system that has led to the emergence of Database Management System? (6)

SECTION - B

3. (a) Explain the basic Relational Algebra operations. Take three queries in Relational Algebra and show their equivalent queries in Relational Calculus. (6)

   (b) What is a view? Explain its role by taking an appropriate example. (6)

4. (a) Explain the mechanisms of maintaining referential integrity based on foreign keys (foreign key rules), considering that null values are not allowed. (6)

   (b) Schema for Employee Management is:

   Employee: Emp_id, Name, Address, Department, Designation, Salary

   Department: Dept_id, Name, Head_id

   Write SQL queries for:

   (i) Retrieving employee who gets maximum salary.

   (ii) Find the name of the department where Emp_id 16 works.

   (iii) Find the total salary given by a department in a month (considering monthly salary structure).

   (iv) List all employees with designation 'Professor' across all departments. (6)

SECTION - C

5. (a) What is functional dependency? What is closure of a set of functional dependency? List all functional dependencies satisfied by the relation below:

A	B	C
a1	b1	c1
a1	b1	c2
a2	b1	c1
a2	1	c3

(6)

[P.T.O.]

(b) How does finding functional dependencies help in Normalization. Explain with example multi-valued dependencies. (6)

6. (a) Consider the following relation : R(A, B, C, D)

The primary key of the relation is A. The following functional dependencies hold:

$A \rightarrow B, C$

$B \rightarrow D$

Is the above relation in third normal form? (6)

(b) What is Boyce Codd Normal Form (BCNF)? With proper example, differentiate between 3NF and BCNF. (6)

SECTION - D

7. (a) What is a transaction? What are ACID properties of parallel transactions? (6)

(b) What are different methods of concurrency control in parallel transactions? Explain Timestamp based concurrency control method. (6)

8. (a) By taking a sample transaction, explain briefly about the working of two phase locking protocol. (6)

(b) What is serially equivalent interleaving? How software locks help to achieve it? (6)

SECTION - E

9. (a) What is Data Dictionary?

(b) How does a Network Model differ from Relational Database Model?

(c) What is Data Independence? Is it a desired or undesired property and why?

(d) What is the difference between WHERE and HAVING clauses in SQL?

(e) What is Multi-valued dependency?

(f) Explain dependency preservation with suitable illustration?

(g) Define foreign key?

(h) Explain Triggers and its types with examples.

(i) What is lossless join property?

(j) What is the significance of null values in DBMS? How are the nulls represented in database system?

(k) What is inconsistent retrieval problem in transaction processing?

(l) What is natural join operation? Why is it used? (12×1=12)