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**17CS53**

## Fifth Semester B.E. Degree Examination, July/August 2022 Database Management System

Time: 3 hrs.

Max. Marks: 100

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

- 1 a. With a neat block diagram, explain the architecture of a typical DBMS. (08 Marks)
- b. Define the following terms:
 

(i) Data Model	(ii) Schema construct	(iii) Instance
(iv) Canned Transaction	(v) Meta Data	

(05 Marks)
- c. Illustrate Data Independence. Explain the types of data independence. (07 Marks)

**OR**

- 2 a. Explain the different types of end users in DBMS. (04 Marks)
- b. Compare the Specialization and Generalization with an example. (06 Marks)
- c. Define attribute and explain the types of attributes with an example to each. (10 Marks)

### Module-2

- 3 a. Explain the steps to convert the basic ER model to relational database scheme with suitable example for each. (10 Marks)
- b. Consider the following schema for a Company database :  
 EMPLOYEE (NAME , SSN , ADDRESS , SEX , SALARY, DNO, SUPERSSN, SALARY)  
 DEPARTMENT (DNAME , DNO , MGRSSN , MGR\_START\_DATE)  
 PROJECT (PNAME, PNO, PLOCATION, DNO)  
 WORKS\_ON (SSN, PNO, HOURS)  
 DEPENDENT (SSN, DEPENDENT\_NAME, SEX, BDATE, RELATIONSHIP)  
 Give the relational algebra expression for the following :
  - i) Retrieve the name of the manager who have more than two dependents.
  - ii) Find the name of employees who work on all projects controlled by department 5.
  - iii) Retrieve the names of employees of all employees who do not have dependent.
  - iv) Retrieve the names of employees who gets the second highest salary.
  - v) Retrieve the name of employee who do not have a supervisor. (10 Marks)

**OR**

- 4 a. Discuss the various set theory operation used in relational algebra with an example. (10 Marks)
- b. Explain the entity integrity and referential integrity constraint. Why each is considered important. Give example. (05 Marks)
- c. Consider the two tables. Apply the LEFT and RIGHT OUTER JOIN operation show the result for  $T_1 \bowtie_{(T_1.P=T_2.A)} T_2$  and  $T_1 \bowtie_{(T_1.Q=T_2.B)} T_2$ .

T <sub>1</sub>		
P	Q	R
10	a	5
15	b	8
25	a	6

T <sub>2</sub>		
A	B	C
10	B	6
25	C	3
10	B	5

(05 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

**Module-3**

- 5 a. Consider the following schema for a Library Database :
- Book (Book\_id , Title, Publisher\_Name, Pub\_year)  
 Book\_Authors (Book\_id , Author\_Name)  
 PUBLISHER (Name, Address, Phone)  
 Book\_COPIES (Book\_id , Branch\_id , No\_of\_copies )  
 Book\_LENDING (Book\_id , Branch\_id , Card\_No , Date\_out, Due\_Date)  
 LIBRARY\_BRANCH (Branch\_id , Branch\_Name, Address)
- Write SQL Queries to :
- Retrieve the details of all books in the library with library\_id, title, Name of publisher, author, Number of copies in each branch etc.
  - Get the particulars of borrower who have borrowed more than 3 books, but from Jan 2017 to June 2017.
  - Delete a book in Book table. Update the contents of other tables to reflect this data manipulation operation.
  - Partition the Book table based on year of publication. Demonstrate its working with a simple query.
  - Create a view of all books and its number of copies that are currently available in the library. (10 Marks)
- b. Explain with an example in SQL:
- DROP command
  - DELETE command
  - INSERT command
  - UPDATE command
  - ALTER command (10 Marks)

**OR**

- 6 a. Define store procedure. Explain the creating and calling of stored procedure with suitable example. (08 Marks)
- b. Briefly explain types of JDBC drivers. (05 Marks)
- c. With the program segment. Explain retrieving of tuples with embedded SQL in C. (07 Marks)

**Module-4**

- 7 a. Explain the informal design guidelines used as measure to determine the Quality of relation schema design. (08 Marks)
- b. Define Normal Form. Explain 1NF, 2NF and 3NF with suitable example for each. (08 Marks)
- c. State the Armstrong inference rule. (04 Marks)

**OR**

- 8 a. What is functional dependency? Write an algorithm to find the minimal cover for set of functional dependency. Find canonical cover of F. The FD
- $$F = \{A \rightarrow BC, B \rightarrow C, A \rightarrow B, AB \rightarrow C\}$$
- (10 Marks)
- b. Consider  $R = (A, B, C, D, E)$  which is decomposed into  $R_1 = (A, B, C)$  ,  $R_2 (C, D, E)$  with  $FD = \{A \rightarrow BC, CD \rightarrow E, B \rightarrow D, E \rightarrow A\}$
- Show that the above decomposition of schema R is not lossless join decomposition. (10 Marks)

**Module-5**

- 9 a. Why concurrency control is needed demonstrate with example. (10 Marks)
- b. What is a transaction? Discuss the desirable properties of transactions. (05 Marks)
- c. With a neat diagram explain the state transition diagram for a transaction. (05 Marks)

**OR**

- 10 a. Briefly discuss the two-phase locking technique for concurrency control. (10 Marks)
- b. How to check conflict serializability of a schedule. Explain with an example. (10 Marks)