

CBCS SCHEME

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21CS53

Fifth Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025 Database Management Systems

Time: 3 hrs.

Max. Marks: 100

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

Module-1

1. a. Explain in detail the characteristics of database approach. (08 Marks)
- b. Define the following terms and also give example :
 i) Database ii) DBMS (04 Marks)
- c. List and explain the advantages of using DBMS Approach. (08 Marks)

OR

2. a. Explain cardinality ratio and participation constraints along with an example. (06 Marks)
- b. With a neat diagram explain the three schema architecture. (06 Marks)
- c. Draw an ER diagram for library database by considering at least 5 entities. (08 Marks)

Module-2

3. a. Explain in detail characteristics of Relations. (06 Marks)
- b. Discuss different types of update operations on relational database. Also give an example. (06 Marks)
- c. Write a note on Natural join and division operation. (08 Marks)

OR

4. a. Consider the 2 tables. Show the result of the following :

R ₁		
a ₁	a ₂	a ₃
20	L	15
15	m	18
25	L	16

R ₂		
b ₁	b ₂	b ₃
20	L	6
25	n	8
28	l	4

(i) $R_1 \bowtie R_2$
 $(R_1.a_1 = R_2.b_1)$

(ii) $R_1 \bowtie R_2$
 $(R_1.a_1 = R_2.b_1)$

(iii) $R_1 \bowtie R_2$
 $(R_1.a_1 = R_2.b_1)$

(iv) $R_1 \bowtie R_2$
 $(R_1.a_1 = R_2.b_1)$

- b. With an example explain steps of ER to Relational Mapping algorithm. (08 Marks)

(12 Marks)

Module-3

- 5 a. For the following Database schema.

Employee (Fname, Minit, Lname, SSN, Bdate, Address, Salary, SuperSSN, DNo)

Department(DName, Dno, Mgr_SSN, Mgr_Startdate)

Dept_Locations(Dno, Dlocation)

Project(PName, Prj_no, Plocation, Dnum)

Works_on(ESSN, Prj_no, Hours)

Dependent(ESSN, DependentName, Sex, Bdate, Relationship)

Write SQL Queries for the following :

- Find sum_of_salaries of all employees who work in Dept No 10, average salaries of all employees who work in Dept No 10. (08 Marks)
- List all employees who do not have any dependent.
- For each project, retrieve the project number and the number of employees who work on that project.
- Make list of all project numbers for projects that involve an employee whose last name is 'Kumar'.

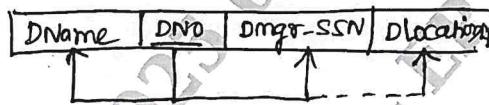
- b. Write command that is used for table creation. Explain how primary key, foreign key are specified in SQL during table creation with suitable example. (06 Marks)
- c. Explain view in SQL, with suitable example. (06 Marks)

OR

- 6 a. Explain stored procedures in SQL with example. (06 Marks)
- b. How triggers are defined in SQL? Explain with an example. (06 Marks)
- c. Write a note on : (i) Cursor (ii) Assertions (08 Marks)

Module-4

- 7 a. List and explain the informal Design guidelines for relation schemas. (08 Marks)
- b. Define the following :
- Functional dependency
 - Key
 - Superkey
 - Prime attribute
- c. For the given schema, discuss the 3 main techniques to achieve first normal form. (06 Marks)



(06 Marks)

OR

- 8 a. Explain in detail 2nd Normal form and 3rd Normal form along with example. (08 Marks)
- b. Write an algorithm for determining X⁺, the closure of X under F. Give an example. (06 Marks)
- c. Write a note on 4th Normal form. (06 Marks)

Module-5

- 9 a. Define Transaction. Discuss ACID properties. (06 Marks)
- b. With neat diagram explain transition diagram of a transaction. (06 Marks)
- c. Explain the Lost Update problem and Temporary update problem with respect to concurrent transaction execution. (08 Marks)

OR

- 10 a. Briefly discuss 2-phase locking techniques for concurrency control. (10 Marks)
- b. Write a note on :
- Deadlock prevention protocols
 - Basic Timestamp ordering algorithm

(10 Marks)
